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FOR THE FIELD
LEPIDOPTERIST PART

TUTT a
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field lepidopterist.

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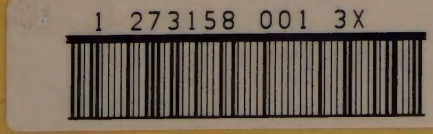

PRACTICAL HINTS

FOR THE

FIELD LEPIDOPTERIST.

BY

J. W. TUTT, F.E.S.

Editor of *The Entomologist's Record and Journal of Variation*; Author of *A Natural History of British Lepidoptera, A Natural History of British Butterflies, A Natural History of British Alucitides, British Noctuae and their Varieties, Monograph of the Pterophorina, Melanism and Melanochroism in Lepidoptera, Migration and Dispersal of Insects, British Butterflies, British Moths, &c.*

I

(Second Edition.)

Price 6s. 0d. net (interleaved).

April 1908.

LONDON:
ELLIOT STOCK, 62, PATERNOSTER ROW, E.C.

BERLIN:
R. FRIEDLANDER & SOHN, 11, CARLSTRASSE, N.W.

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PREFACE.

Seven years ago, April, 1901, this work was first offered to the entomological public in almost its present form; we have, however, in this edition, added, at the request of many of our supporters, practical chapters on the "Collection and Conservation of Lepidoptera," "Killing Lepidoptera," "Pinning Lepidoptera," "Entomological Pins," "Setting Lepidoptera," and "Labelling," thus completing, as it were, with the preliminary chapters in Part III, a finished practical mental outfit for the collector who wishes to obtain a scientific result from his collecting.

So well was the first edition of this part received, and so eager were field-lepidopterists for more hints, that eighteen months later, October, 1902, another book was issued as Part II. In spite of the fact that this was half as large again as the first part, more hints were still demanded, and, in January, 1905, Part III was issued, together with an Index to Parts I, II and III, and several full-page illustrations.

In the three parts was now collected almost everything known to the field-collector, and everything that would aid him in his scientific work. Besides more than 3000 Practical Hints (the names of the species, with references, occupy some 45 demy octavo columns), full details relating to Apparatus, Beating, Breeding-cages, Collecting adjuncts, Collections, Eggs (a most important illustrated chapter), Foodplants, Photographing eggs (illustrated), Flowers, Hybernating, Oviposition, Hybrids, Ivy, Lantern-work, Larvæ (another important illustrated chapter), Mined leaves, Light, Localities, Mothing, Night-collecting, Preservation of eggs, larvæ, pupæ, imagines, Pupæ (most important illustrated chapter), Rearing, Retarded emergence, Rock-work, Sallows, Sandhill work, Searching, Second-broods, Postal facilities, Sleeving, Substitute foods, Sugaring, Sweeping, Tree-trunks, Winter-work, etc., were given (the General Index to these matters occupies seven full demy octavo columns).

By this time Part I was out of print. Occasional odd copies were sold at almost double the price, and we were pressed to reprint. But our large work—*A Natural History of the British Lepidoptera*—had already been delayed too much in the preparation of these three parts, and, as it was evident that chapters on the lines of those in Part III would improve Part I greatly, the matter was allowed to slide till opportunity occurred. Recently, however, applications for Part I have been so frequent that there appeared to be no real reason for further delay, hence the appearance of this Second Edition at the present time.

In order to facilitate reference, we have carefully maintained the paging of the first edition, numbering the additional pages with a different style of figures. We trust these new chapters will be as acceptable to field-naturalists as their predecessors have been; and we hope that those who become possessors of the new edition of Part I will find as much satisfaction in its contents as those who supported the first edition appear to have done.

With regard to the use to which these "Hints" may be put, we can only repeat what we said in the Preface to our 1st edition of this part, that "it is the knowledge that only a man (or woman) who has collected his (or her) own material, who has studied the life-histories and habits of some one or many species in detail, can ever become a really useful scientific naturalist, coupled with the feeling that much preliminary labour may be saved by knowing how, when, and where, to look for certain species, that the following hints are given. One recognises that this may have a directly contrary effect to that wished, in the loss of initiative and self-reliance in young lepidopterists, and may lead to the rapid making of collections by some without advantaging the science of entomology, but such individuals as would thus abuse the information herein contained never would probably become naturalists, and one can only hope that their purposeless efforts will not be inimical to the progress of science. At the same time, if these notes help the young scientist to make a sufficiently large number of observations in a short time, and thus enable him to rapidly accumulate the preliminary facts on which he can base future generalisations, they will have served a good purpose." We trust that this edition may receive as warm a welcome as its predecessor.

PRACTICAL HINTS

FOR THE FIELD LEPIDOPTERIST.

CHAPTER I.

THE COLLECTION AND CONSERVATION OF LEPIDOPTERA.

The collection and proper keeping of insects for the purposes of scientific investigation has been practised for considerably more than two centuries. During this period various systems of manipulation and preservation have been evolved, each, perhaps, equally satisfactory in its own way, yet each claimed by its particular adherents to be far superior to that practised by others. In Britain the mode of setting lepidoptera is peculiar and characteristic, differing widely from that adopted by all other lepidopterists in the Old and New Worlds. As a result, our entomological pins are quite unlike those used in other countries, our cabinet-drawers and store-boxes shallower, whilst other details vary greatly from those in general use on the Continent, although the apparatus used for collecting, rearing and killing specimens, are much the same as elsewhere. A few words as to this apparatus may be desirable.

First with regard to collecting lepidoptera. It is quite clear that, if we consider the comparative size of Hawk moths and Nepticulids, considerable difference will exist in the apparatus required. The special collecting of the mines and imagines of the latter, as well as those of the Lithocolletids, etc., the linen bags required, the mode of keeping the mines, etc., are all treated in detail, in various paragraphs distributed through the three parts of *Practical Hints*, and can readily be discovered by reference to the Index in Part III. Assuming, however, one is about to do an ordinary day's collecting, means to take examples of everything useful he meets, and wishes to bring them home safely, the question arises as to what is the best outfit. One suspects just such an outfit as the writer has when he is doing a day's work now on the mountains of Central Europe, where most is fish that comes to the net, and just such as he required twenty-five years ago, when he was in a similar stage with regard to British lepidoptera.

First and foremost is a satchel or bag clearly divided into two compartments, or, in its place, a satchel and bag, or two large pockets round the inside of the front of a loose jacket; in one of these divisions or pockets a supply of nested glass-topped or glass-bottomed boxes, which can be transferred to the other pocket or bag as each becomes filled. Then a zinc box of good size, carefully washed out before starting with warm water, for the double purpose of preventing

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mould, and keeping the insects placed in it flaccid and limp, a supply of black enamelled pins (Tayler's No. 8), two or three small linen bags (6 or 8 inches long and 3 or 4 inches wide) with strings. These, besides the net and stick (for beating, or lengthening the net if used generally without one), are about all I ever take. Some people take killing-bottles, chloroform, oxalic acid and prickers. The writer abhors all these things, others like them; the results with and without them in different hands are practically identical. For an ordinary day's work when morning hope leads one to trust that one may bring home say 200 specimens or thereabouts in good condition—a net, sewing-needle and cotton, a large "zincer," a ¼-oz. of black 8 pins, and nested glass-bottomed boxes are quite sufficient for me. To these two or three linen bags, some twine, and two or three small tins of mustard-tin shape about 2 ins. high and 1½ ins. diameter, are usually added, and one usually wants no more.

All the larger butterflies are "pinched" on the spot, pinned with the wings well up, each quite close to the next, until a serried ring runs all round one side of the box, the antennæ towards the centre, the tails towards the outer edge, and well away from the rim. This filled up, the opposite side is similarly treated, but the insects placed a little more forward than on the first side, so that the wings do not push against those opposed to them, for our zinc boxes are rather shallow for Apaturids and the larger Argynnids, and the apices of the fore-wings of many a fine specimen of *Apatura iris* and *Dryas paphia* have been injured for lack of taking this precaution. The smaller bodied butterflies we also pinch, *e.g.*, "blues" of *corydon* size, but "blues" like *Cupido minima* and *Everes argiades*, and all "hairstreaks" and skippers must never be pinched; they carry well in the glass-bottomed boxes, to which Geometrids, Noctuids, Tortricids, and all the smaller "fry" are also consigned. The "full" boxes should be kept cool and in the dark, and the moths should be left in them just as short a time as possible, It may be taken for granted that the sooner they are consigned to the killing-tin the better, and, above all, if one wants good specimens, one should never allow them to remain in the boxes alive all night. By failing to take this precaution, moths without wing-tips, others with scaleless thoraces, and yet others damaged in various ways, have resulted. The system is blamed where it is the fault of the individual. Having caught the specimens, care should be taken to kill them in the best possible condition.

Keen eyes will always detect larvæ—one is not supposed now to be on a "larva-beating" expedition—these will, if small, be put into the tins, if large, into the linen bags. Large larvæ in tins "sweat," sweated larvæ are naturally unhealthy, and this can easily be prevented by using the linen bags, and not the tins. A strong knife, a few pieces of twine, a needle and cotton for rents in the net are absolutely necessary, and this is all.

For a holiday trip at home or abroad, a setting-case (with setting-boards) and store-box are also required; nor must one forget duplicate nets, pins (all sizes used), a charged brass chloroform tube, camel-hair brush, and killing apparatus, spanners, tracing-paper, "Lilliputian" pins, etc. Some of these things are difficult to procure abroad at any time; in out-of-the-way places it is impossible to get any of them.

CHAPTER II.

Killing Lepidoptera.

After insects are caught, and before they can be "pinned" and "set," they must be killed. There are many methods adopted for killing lepidoptera, each one of which produces excellent results in the hands of the person who practises it skilfully. Practice makes perfect, and, if one has carefully used one's brains in his work, there can be no doubt as to the result, whatever method be adopted. It has often been a mere matter of chance, in the first place, as to how a particular lepidopterist came to kill his specimens. Almost every beginner who has, at first, wondered how he should kill his captures, has been able to look up some friend, some older hand, who has been able to advise him, or, perchance, has seen someone perform the operation. As a result, he has adopted this particular custom, and become proficient in it, happy that he knows no other. Learning that there are other methods, our young collector promptly refuses to try any of them, averring (without knowing anything about it) that his own plan is vastly superior, or, if he try it, immediately compares the results obtained, by a method in which he is not expert, with a method in which he is, and is for ever convinced that no other process can possibly equal his own; and this is true, if he goes no further, for the best method for an individual is distinctly that which produces the best results in the operator's hands.

The first (and perhaps natural) method, probably, adopted by beginners, is to "pinch" their captures, giving a sharp nip to the thorax of the insect beneath, when the wings are drawn up over the back, through the material of which the net is made, and, for butterflies, which naturally draw up their wings, many an old hand prefers this method to the end. We ourselves do, and, in our very large collection of European butterflies (some thousands of examples), hardly a butterfly has not been so killed, with the exception of "Skippers," that resent it badly, whilst the practice is risky with small "blues" and "hair-streaks," which usually find their way into boxes to be emptied into the "ammonia tin" with the "omnium gatherum" of a day's collecting, or are stupefied with chloroform, pinned, and nipped in due course. Pinching slender-bodied insects without injury depends entirely upon having soft and pliable material for a net, and a delicacy of touch that enables one automatically to feel that one is right in what one is doing, has the insect in exactly the right position, and the fingers in exactly the right place for the pinch, without, if need be, even looking at the specimen or really seeing it. Some collectors never can, and never will be able to, kill insects by pinching them, without spoiling them, and no amount of practice will enable them to do it; others can do so without removing a scale, and without the slightest trace that the insect has been handled.

Apart from this haphazard mode of killing lepidoptera, there are many recognised, and what may be termed legitimate, methods of doing so, with some of which we now propose to deal in detail.

Laurel.—The "Laurel jar" was much more in vogue some years ago than is the case nowadays, but, even at the present time, it is widely used, certainly more often by coleopterists than lepidopterists. It may be well then to enquire into the *modus operandi* of this cheap and easy method of killing insects. Young laurel leaves, crushed, so

that the sap is set free, liberate the "hydrocyanic" or "prussic acid" in the leaves, and, placed in an air-tight jar or tin, will deprive an insect of life almost immediately, and will also keep an insect in a relaxed state for some little time before it need be set. The best mode of making a killing-bottle, by this means, is to take a wide-mouthed pickle-jar, one with a patent lever stopper is much to be preferred to one with a large cork, and this should fit so as to make the bottle quite air-tight. The bottle is better than a tin-box, as the latter is more difficult to keep absolutely air-tight, and hence, in this, the laurel dries up more quickly than in the jar. It appears to be very important that the laurel should be picked during dry weather, whilst the best time, undoubtedly, is the afternoon of a bright sunny day at the end of May, or beginning of June, as the young shoots are then tender and full of sap, and so much more suitable for the purpose for which they are required. Laurel picked in damp weather is sure to become mouldy. To thoroughly bruise the leaves, lay the gathered shoots on a newspaper, and pound well with a hammer, so that the stems, as well as the leaves, may be thoroughly broken; then fill the bottle rather more than three parts, lay a sheet of blotting-paper on the surface, and it is ready for use. It is inadvisable to keep the bottle anywhere that is at all damp, nor should it be placed in any spot sufficiently heated to allow the bottle to sweat. Otherwise, with care, and prepared in this way, the bottle will last for a long time; we remember seeing one in the best of condition in the possession of a well-known microlepidopterist of twenty-five years ago, that he assured us had been in use rather over two years; this was a very close fitting biscuit-tin, absolutely air-tight, and of considerable size. It need hardly be said that the mouth of the bottle should be closed as quickly as possible after being used, as exposure for any length of time must naturally injure its efficacy, and lessen the strength of the vapour that arises from the crushed leaves. The jar also serves, up to a point, for relaxing purposes, but care must be taken not to leave insects too long before setting. The use of a small laurel-jar as a killing-bottle whilst collecting, though most useful to coleopterists, is not recommended for use by lepidopterists. In small bottles the laurel requires, of course, to be renewed much more frequently than in large ones.

Cyanide of potassium.—Home-made "killing-bottles" were rarely resorted to by lepidopterists. The cheapness, finish, and general all-round excellence of the "Cyanide-bottle," as formerly turned out by the dealers in entomological apparatus, put any home-made article completely in the shade, and out-distanced any amateur attempts from the point of view of efficacy, quality and general excellence. Such a "killing-bottle" made of a thick layer of cyanide of potassium, in the bottom of a wide-mouthed glass bottle, covered with a layer of plaster of Paris, and corked so as to make it air-tight is generally used for all field purposes, even when other means are adopted for killing lepidoptera in bulk at home. These cyanide bottles are comparatively permanent, most of them lasting for some years, if kept carefully corked when not in use, and if provided with a thoroughly tight-fitting bung. The temperature, too, affects the efficacy of a cyanide bottle, the killing being effected much more rapidly in hot than in cold weather. The "hydrocyanic" or "prussic acid" principle in the cyanide bottle soon overcomes an insect subjected to it, and it almost immediately becomes stupefied and is pinned with ease. If, however, it be removed too

rapidly from the killing-bottle to the collecting-box the insect will recover, and may be found in a few minutes wheeling round on the pin, and injuring not only itself, but spoiling any other insect with which it may come in contact. On the other hand, if the insect be allowed to remain sufficiently long in the killing-bottle for it to be really killed, then *rigor mortis* quickly supervenes, the insect stiffens, the antennæ, legs, etc., readily break, and setting is practically impossible. Continued exposure to the cyanide, however, quite counteracts this, and, after from 24 to 48 hours, the specimen will again become flaccid, may be easily manipulated, and sets easily. This, of course, necessitates some delay between the killing and setting, but, granted that this is of little importance, excellent results are readily obtained. It is generally assumed that about 20 hours is sufficient to allow the stiffening to pass off in small lepidoptera, and quite 48 for larger ones. The fact is, there is considerable individual difference, and experience is the best and the only guide to these peculiarities. Once the rigidity, however, has passed off, the specimen is in an exceedingly nice relaxed condition for setting, the wings, antennæ, legs, and, indeed, every part of the insect can be readily moved and arranged with the utmost ease and given the final position they are to take in the setting. Granted then the condition that one can afford to wait before setting his insects and allow sufficient time for the rigidity of the newly-killed specimens to pass off, there is much to be said for the cyanide bottle. Its much greater handiness, and its decidedly rapid action are exceedingly in its favour, for both tend to enhance the perfection of the specimen, whilst, in addition, it is positively asserted that insects so killed are less liable to mould than those killed by other means. On the other hand, the suppleness that ensues after *rigor mortis* has passed off, has one drawback, and that is that the specimens dry on the setting-boards much more slowly; why the fluids of the body should be so affected we do not know, but, under similar conditions, moths set after being killed with ammonia were fit to remove after four days, whilst others of the same species killed with "cyanide" were still quite limp after being on the setting-boards for a week and, indeed, for a much longer time. Like "ammonia," the action of cyanide tends to injure the colours of some lepidoptera if the latter be exposed to its influence for any length of time, *e.g.*, *Agriopis aprilina*, *Hylophila prasinana*, *Melanargia galathea*, etc. The species most readily injured are either green, glossy black, or whites in which the pigment-factor readily changes to yellow. For these, neither "cyanide" nor "ammonia" should be used, or, if used, the insects must only be subjected to their action just sufficiently long enough to kill them. Many expert lepidopterists use "cyanide" and others "ammonia" mixed with a modicum of "common-sense" quite successfully, even for the reputed most recalcitrant of species. Without care and common-sense no method can be successful.

To those who would make their own "cyanide bottle," we offer the following mode of preparation (Mutch, *Ent. Record*, i., p. 112):—

Cyanide of potassium, 1 part. Plaster of Paris, 2 parts. Water, 2 parts. First roughly powder the cyanide and mix with the plaster of Paris, then add the water. Thoroughly mix, and quickly pour into suitable wide-mouthed bottles; when set, place a layer of white blotting-paper on the top for the purpose of absorbing any exudation from insects caught at sugar, or excreted by freshly-emerged examples. The above form of bottle will be found to constantly give off vapour until all chemical action has ceased.

Our final advice, however, is do not make your own killing-bottles, but buy them ready made. Owing to the "Poisons Act," dealers in entomological apparatus do not now sell Cyanide bottles. They are made by manufacturing chemists, and are sold only to householders known to them, or to entomologists introduced by such. They are cleaner, more lasting, more expeditious, and altogether better than any home-made ones we have ever seen.

Saturated solutions.—For killing large moths, Skinner (*Ent. Rec.*, ii., p. 114) recommends a saturated solution of cyanide, introduced with a toothpick or splinter of wood. A strong home-made solution of HCN (HCy), is also recommended, and can be used like strong liquid ammonia (·880), for the killing of a few examples and not *en masse*, *viz.*, a drop or two on blotting paper put into the pill-box. Its effect is said to be instantaneous, and no fluttering occurs.

Chloroform and oxalic acid.—These two are generally used as supplementary to each other, the chloroform to stupefy, the oxalic acid to kill, the insect, and, with practice, it is a clean, rapid, and expeditious method, and, in the hands of the careless, is not liable to the charge of injuring the colours, as is the case with "cyanide" and "ammonia." The action of chloroform is almost instantaneous; an insect succumbs almost directly it is brought under its influence, and we ourselves often resort to it for tiny moths, although long use with ammonia has led us to use the latter to kill almost all our captures. Small species are soon killed outright by chloroform, and can be killed and set at once, but on large species its action is sometimes merely temporary. The insect becomes insensible at once, and may then be pinned. To prevent it recovering, it is then customary to at once stab into it a strong solution of oxalic acid. This is done by means of a pen-nib, which, dipped in the solution, is then thrust under the wing into the thorax on one or both sides. Two stabs are usually quite sufficient to kill even the largest lepidoptera. The greatest objection to the use of "chloroform" alone is the rapidity with which *rigor mortis* sets in with death; the insect must be set at once, or a period of 24 hours must elapse in order to let it pass off, otherwise legs, antennæ, etc., will snap off even without provocation, whilst, unless the insect is quite dead when placed on the setting-board, the insect will shortly become quite active and almost certainly injure itself before detected. Certainly, insects of delicate colours—greens, glossy blacks, and certain whites—can be better killed without injury by this means than any other. When both chloroform and oxalic acid are used, the insect should also be set at once, as *rigor mortis* not only sets in immediately, but the insect rarely appears to attain anything like the same flaccidity to which one is accustomed with the use of ammonia. Another objection to the use of oxalic acid is the possibility of injury by careless stabbing, whilst an overload of acid will sometimes spread over and disfigure the wings. A steady hand and a little experience, however, do away with these difficulties. Some insects are most refractory under the influence of cyanide, *e.g.*, unless the bottle be a very strong one, "burnets" will walk about damaging one another, and anything else therein, for a very long time before being overcome; so will some dragonflies; for such as these the use of "oxalic" is in every way advisable. A small phial with the "solution" and a "lithographic" or other pen, a "steel" nib preferably, are the

only apparatus required. Chloroform may be kept in a stoppered bottle, and it has been suggested that a well-corked one ought to be inverted, but the brass chloroform bottle of Watkins and Doncaster prevents evaporation and is to be recommended. Owing to the corrosion of an ordinary steel nib, it has been suggested that the best pricker is made of a mixture of silver and platinum, which does not corrode though continually in the acid. It should be very fine (about $\frac{1}{16}$in. in diameter), tubular (in order that it may take up a quantity of the acid), and finely pointed, so that a very small moth can be pricked with it. Instead of oxalic acid, many smokers use the nicotine from their pipes, and it is believed by such that nicotine has not the same disintegrating effect on the insect as the acid.

Ammonia.—Those who kill their insects by means of ammonia, do not always adopt the same method, and different operators are equally successful in far different ways. Our own method is perhaps rough-and-ready, but is exceedingly effective and practicable. As we use glass-bottomed boxes for all our captures that are brought home alive, we have found it advisable to prick through the lid three holes with a large (red hot) needle. This allows, when collecting, a free ingress of air, and, later, a free passage of the fumes of ammonia when the insects are to be killed. Chip-boxes of course allow the passage of the fumes through their substance without holes. For the purpose of killing we use an air-tight tin, with a thin layer of cotton-wool spread over the bottom. On this we pack the boxes containing the insects, leaving a small empty circle in the middle with a small piece of sponge in it. When all the boxes are in, we pour into this space, on the sponge, a few drops of the strongest liquid ammonia, we then place another thicker layer of cotton-wool over the boxes, close the tin, and leave the insects till wanted; if they are put in overnight, we usually leave them till the morning, when the specimens are in first class condition for setting, flaccid, easily moved, so that legs, antennæ and wings, can be readily manipulated. About two hours is, however, quite sufficient if the insects have to be set earlier than here suggested. It must be observed that the ammonia must never touch the insect; it is placed in the tin quite away, and separate, from boxes and insects; some lepidopterists use a small deep saucer satisfactorily. The touching of the insects' wings with the ammonia is often fatal, but with care there is, in our opinion, nothing so safe, so clean, quick, effective, and so free from trouble. It is to be further observed that specimens killed with ammonia dry much more rapidly on the setting-boards than when killed with cyanide.

Certain details must now be noted. The tin should be air-tight. When travelling, and a minimum of impedimenta is important, a large basin with a thick towel or cloth, and then turned upside down is equally effective. Necessity is the mother of invention; we have used many things in place of a tin in the course of the last 30 years, and so long as liquid ammonia of the right strength is used, the result is sure to be satisfactory. The strength is known by the mystic figures ·880, and should be insisted upon. There is no scuffling, no flying or fluttering in the boxes, no falling down partially stupefied and movement continued till the insect's condition is spoiled, no injury at all; the insect falls slowly backward motionless and dies without a struggle. Weak ammonia is more or less ineffective, as also

is an insufficient dose; if only partial stupefaction occurs, the insect is ruined.

But ammonia carelessly used can be far from quick and effective as we have already shown; it can also be far from safe. Exposure to the influence of ammonia for a short period will markedly affect the colours of some insects, but most soon recover. Exposed for a long time, they cease to recover, and the appearance of the insect is permanently injured. As illustrating the former condition one may notice the white fringes of the "blue" butterflies, the white areas of the Melanargias, etc., but exposure to the air soon causes them to recover their original tint. But the glossy "browns" of Erebias, etc., may be permanently injured, and dulled; green Geometrid moths may become permanently yellowed, etc., by too long exposure, and under no conditions should such be exposed longer than is necessary to cause death. Most of course can be left without fear of injury, but experience will show that *Agriopis aprilina*, *Hylophila prasinana*, etc., become permanently yellowed, that *Melanargia galathea* and *Leptidia sinapis*, etc., also became yellowed, that the red of *Rumicia phlaeas* becomes brassy, that the lovely gloss of Erebias (*aethiops*, etc.), Theclids (*pruni*, etc.), Limenitids (*sibylla*, etc.), and Plusiids (*chryson*, etc.), is entirely ruined, and that the rich purple of *Penthina fuligana* is dulled, if subjected to the influence of ammonia for too long a time. In such cases, a short exposure, or chloroform and oxalic acid, will prevent any injury. It is to be noted that many of these same insects with unstable pigment are injuriously affected by too long an exposure to cyanide.

Some lepidopterists adopt the plan of introducing into an air-tight bottle or tin, a few knobs of solid sesqui-carbonate of ammonia, with the full boxes and their contents, so that death ensues, if the salt be in good condition, in half-an-hour. Our own experience with this method has been unsatisfactory; possibly due to our own inexperience or because the salt has not been sufficiently powerful. We had, in our early days, a good many spoiled insects result, owing to the stupefaction of the specimens having proceeded too slowly. To retain this sesqui-carbonate in sufficiently good condition it should be kept in a carefully corked vessel, mouth downwards. Anderson says (*Ent. Rec.*, i., p. 112) that he uses this method but first puts them into a comatose condition by using chloroform, which would take considerable time with a really heavy day's or night's "take."

For the purpose of a killing-tin in which to use liquid ammonia as a killing agent, Farren gives (*Ent. Rec.*, ii., pp. 67-8), the following: A cylindrical tin 14 ins. to 15 ins. in height, by about 5 ins. in diameter, with a lid at both ends, whilst one end—the bottom—has, in addition, a false bottom of perforated zinc, about three-quarters of an inch up. Put the boxes containing the moths in first, and having shut the lid, take off the bottom-lid and pour a little ammonia on a piece of sponge, and close it again without losing any of the fumes.

Ether.—Morice recommends (*Ent. Rec.*, xii., p. 222) hymenopterists, when collecting, to abandon cyanide, and use only pure sulphuric ether without alcohol. The specimens so killed not only preserve absolutely their natural colours, even those delicate yellows which cyanide and ammonia nearly always turn red or brown, but die in natural positions, etc. The perfect cleanness of the specimens killed by ether, also appears to be much more than enough to repay the

slight extra trouble and expense involved in using it. The objection to ether is its rapid evaporation, but this can be met by carrying a phial in the waistcoat pocket, from which a few fresh drops can be supplied to the collecting-bottle from time to time as required, and this should always be done, as a *coup de grace* to finish off any possible survivors in the bottle when one returns from an expedition. Then, if the bottle be well-corked and unopened for an hour or so, the result is almost sure to be satisfactory. We are not certain whether any system that involved so much uncertainty and slowness in producing actual death could ever be modified into an efficacious mode of killing lepidoptera. Chitty also recommends (*Ent. Rec.*, xviii., p. 134) ether with which to kill certain delicate species of coleoptera. He suggests putting the insect into a very small collecting-tube, blocking it up at the end with a piece of paper; another wad of paper should then be put in the tube, followed by the insertion of a drop of ether on a piece of cotton wool, cork up for five minutes, and then take the insect out. Care is necessary not to wet the insect with the spirit, and it is to prevent this that the two wads of paper should be used. We do not see that this method would be applicable to the killing of lepidoptera.

To those who wish to study the various methods adopted for killing insects, we cannot do better than refer them to the long series of articles and notes written by many lepidopterists, and published in *The Ent. Record*, vol. i., pp. 41, 66, 111, 186, 258, 344; vol. ii., pp. 67, 114; vol. ix., p. 121; vol. xii., p. 222; vol. xviii., p. 134, etc.

CHAPTER III.

Pinning Lepidoptera.

Pinning lepidoptera, apart from setting them, is a most important and delicate matter. Few lepidopterists have, at the outset, the instinctive touch that knows that a pin is being placed directly through the centre of the thorax, and that it will automatically come out below between the last pairs of legs without injuring them or breaking them off; nor does any amount of practice give some people this intuition, and to the end they will pin insects either from the front, so that the pin falls forwards to the everlasting detriment of the antennæ, or backwards, so that the pin cannot be properly inserted into the cork, except obliquely, and so that danger to the abdomen is for ever imminent, or sideways, which is possibly worst of all. The ideal position is that the pin shall be almost upright when the insect is dry, or inclined forward at the slightest angle from the perpendicular.

To pin an insect properly then, great care should be taken. Lepidoptera generally die in one of three attitudes; the first, most peculiar to butterflies and Geometrids, is with the wings closed above the thorax; the second is the reverse, with the wings down, *e.g.*, Noctuids, Pyralids, etc.; the third is with the wings horizontal, *e.g.*, Alucitids, Gelechiids, etc. The first is, perhaps, the easier to deal with. To pin it, take the insect gently between the thumb and first finger of the left hand (it may be lifted by the proboscis, leg or body either with the fingers or forceps); hold the pin with which the insect is to be

set in the right hand, and carefully pierce the centre of the thorax, bringing out the front of the pin between the last pair of legs beneath. This will be at a slight angle, the head of the pin sloping very slightly forwards. The pin should project about one-third of an inch beneath, a little more or less according to the size of the insect. With the forceps give a slight pinch at the bases of the forewings, which will loosen the muscles, and, in those with the wings raised above the thorax, tend to bring them into a more or less horizontal position, and those that have died in the reverse position to assume a somewhat similar attitude. It may be advisable, even, before the pinning is properly done, to force back the wings with the forceps, when an insect has died with the wings down on either side of the legs, or inside out, as it is sometimes called. When an insect dies horizontally, it can be as a rule readily pinned (on a cloth or sheet of blotting-paper), without any handling, and, in the case of "plumes" and other long-legged species, this is very advisable, for the loss of one of the legs is fatal to the appearance and value of one of these insects.

Uniformity in pinning is very desirable. An insect with the pin projecting so short a distance beneath that it can get no grip of the cork without the body of the insect touching it, is most undesirable, and one "skied" halfway up a long pin is most objectionable to our specially trained insular taste in these matters, whilst an unhappy irregularity in this matter, some "low" and some "high" on the pins, is perhaps the greatest eyesore of all. We are at one with those who like uniformity of pinning. Even those who adopt the Continental method, and set the insects high up on a very long "Vienna" pin, should adopt an uniform standard for the same insect. Nor is the art of pinning even yet done with, for it is of the greatest importance that the pins should be placed in an absolutely direct line on the setting-board, otherwise the specimens will come off the boards with the pins haphazardly upright, or leaning to left or right, with a most deplorable result. A series of specimens, well-pinned, should finally then have the pins in an absolutely straight line.

An insect, stupefied with chloroform and pierced with oxalic or nicotine, is in a beautifully limp condition for setting either at once or within 24 hours, if kept in a cool (but not moist) atmosphere. Such an insect may be laid flat on a piece of cabinet-cork, its wings easily spread out with a setting-needle. Then the operator, steadying the insect by slightly pressing its waist with the setting-needle held in the left hand, runs the proper-sized pin (held by the forceps in his right hand) through the thorax, and so altogether avoids handling the specimen during the process of pinning.

Very small micro-lepidoptera may be pinned by laying the specimen on a soft cloth, and taking a fine pin held by forceps in the right hand. The insect may then be pinned, the action being guided by a lens held in the left hand. Before placing the insect on the setting-board its wings should be gently blown over its back. This will much facilitate the setting out of the wings.

The young lepidopterist should, at the very outset of his career, learn to handle forceps with facility. He will then be able to use the smaller and finer sizes of pins from the very first. Otherwise, with the fingers, he must of necessity confine himself to the larger sizes of pins, or he will break or injure many specimens owing to his inability to handle satisfactorily the smaller pins with his fingers.

CHAPTER IV.

Entomological Pins.

The selection of the right quality and size of entomological pins for a certain insect is more important than, at first sight, might appear. Experience has shown that there is considerable difference in the quality of the pins made by the special makers, and that this difference of quality may be connected with certain definite sizes which they manufacture. Use, too, has accustomed us to form a certain ideal concerning the *ensemble* of a well-pinned and well-set insect, and, in this ideal, the size, colour, and general suitability and effect of the pin play a very prominent part.

First and foremost, ordinary entomological pins may be either "white" (or as they are termed "silvered"), "gilt" or "black," the latter being "japanned" or "enamelled." In the first days of entomology, all entomological pins were "white," then "gilt" became fashionable, but neither "white" nor "gilt" pins were able to prevent the development of "verdigris," a chemical compound resulting from the action of the fats in the insect with the metal of the pin. To obviate this, black enamelled pins were manufactured, and, although a few lepidopterists still maintain their preference for "white" or "gilt" pins, the greater number of experienced collectors use "black" ones, not because they altogether prevent verdigris, but because they stave off the evil day a longer time than white or gilt.

Two charges have been brought against "black" pins—(1) that they are unsightly, (2) that the finer sorts are softer, liable to bend, and that, therefore, a good insect may, in a moment, be irretrievably ruined or entirely destroyed. All one can say with regard to their unsightliness is that it is largely a matter of taste and opinion, and that it never occurs to those who have always been accustomed to them. To the older collectors, used as they were to the "white" or "gilt" pins, the "black" certainly appeared, at first, somewhat ugly, but we must confess that it is a side of the question that never, even in our early days, appealed to us. To those who uniformly use black pins, it may be safely asserted that they do not catch the eye in the cabinet like white or gilt pins. The second defect is a much more serious one. It is true that all japanned pins are softer than silvered ones, and that finer sizes show the defect most distinctly. This is due to the fact that the process of japanning must be done at a high temperature. This, in turn, has a tendency to soften the wire, and causes the pin to be less elastic, but, some time since, D. F. Tayler and Co. manufactured a "black-bronzed" pin, which, being done in solution, did not soften the wire. We were rather prepossessed in favour of these pins, but, after a time, the firm ceased to manufacture them, giving as the reason that the process adopted proved to be less suitable for finishing this kind, than that adopted for the usual black enamelled pin.

The ugliness of the black pin, so far as it exists, is largely due to the size of the head. It is unfortunate, but true, that the pins with the largest heads are often the best as regards temper and point, the head being made first and the point ground true with the head. In the

ordinary process the point is ground first, and the head made afterwards, with the result of great injury often occurring to the point in the heading process, but D. F. Tayler and Co. assure us that their entomological pins are now made by one process, in an automatic machine, which both heads and points them, and certainly the heads are now much smaller than formerly. It is equally true that black pins never do have, even under the best conditions, as good a temper and point as gilt or silvered pins; it is equally true that the japan varnish is to a certain extent soluble in the acrid fatty matter, and it results therefore that, in some cases, the imperfectly, or insufficiently, japanned "black" pin, is no better than its "white" or "gilt" relative, and the black pins used for moths that grease very freely, are often affected with verdigris nearly as quickly as if "white" or "gilt" ones had been used, but still "black" pins do postpone the final catastrophe, and, with some of the "wainscots," and other "internal" feeders, the only way to prevent verdigris is to extract the fatty matters by immersion in benzoline or otherwise, before the pins have become green. We understand that these pins are manufactured of steel, nickel or brass, and that the temper of the two former is better than that of the last-named, but the steel pin is more subject to meteorological influences, rusting badly in damp climates, whilst nickel is too expensive for general use.

It is to be remembered that insects killed with ammonia should be well "aired" before being pinned, the ammonia itself upsetting the metal very badly, the "white" pins again being affected much more rapidly, however, than "black." It is, indeed, a risky matter to pin any insect directly it is turned out from the ammonia tin. On the whole, however, we have no doubt of the advantage of "black" over "white" pins in matters of preservation, and, in spite of some softening of the metal and bad points, the younger collectors would do well to use black pins, after careful selection, even if they continue to risk spoiling a few specimens, and this is particularly so in the case of those who collect the micro-lepidoptera, otherwise there would appear to be no alternative in many of the genera of the "smaller fry," whose larvæ are root- and stem-feeders, than to collect a series every seven or eight years, and, of course, in the case of rare or exceedingly local species coming from outlying districts, this might prove most difficult if not altogether impossible.

The doubling up of a pin, especially at some little distance above the point, is an abomination, often leads to the entire destruction of an insect, and this, possibly, one of historical value, that cannot be replaced. The quality of the enamel is, as we have shown, vital, for a badly-enamelled pin may tend to the destruction of a most valuable and possibly unique specimen. The general quality and temper of the wire used and the perfection of the points are also of the highest importance. It becomes necessary, therefore, to choose, in every case, from the different makers, the pins best suited for one's own particular requirements.

Roughly, one may say that the pins used by lepidopterists are manufactured by two firms—D. F. Tayler & Co., and Kirby, Beard & Co.—the products of both being stocked by almost all the best known dealers in entomological apparatus. At any rate, sample cards with sizes and prices can always be obtained from the firms direct or from Watkins & Don-

caster, 36, Strand, W.C. The wares of each of these makers have their thick and thin supporters, usually as one falls into using certain pins in one's early entomological days, by chance, and the inherent objection to change leads one to become satisfied, and to maintain the opinion in favour of one's own practice. But a rough-and-ready criticism between the pins made by these firms has always been available for the more thoughtful users; and this may be summarised as falling in the direction that "Tayler's" pins have a better temper, are better pointed, have larger heads, and hence are more ugly, whilst "Kirby, Beard's" are softer, more liable to bend, have less satisfactory points, smaller heads, and a better general appearance. We believe that the japanning is usually more thorough in "Tayler's" pins, and that there are fewer joined together in twos and threes than in "Kirby, Beard's." Some lepidopterists maintain that the sizes made by the latter are, in some cases, more suitable. There is, however, little difference in the sizes of the pins, and since the former has adopted the new method of manufacture, there is very little, if any, difference in the size of the heads of the pins manufactured by these firms. There is no question that the lepidopterist who spends time on the examination of the various sizes and kinds manufactured, and makes a careful selection, is, however, the best served. Certain pins made by the respective makers appear to be in general favour with all the more advanced lepidopterists.

As we have already noted, the small heads of "Kirby, Beard's" pins are in their favour, and, in the larger sizes, the difference in temper and points is less marked when compared with "Tayler's." The larger sizes of the former then, may be more safely used than the smaller, but one finds a general unanimity among entomologists that, if black, and not white, pins are used, the finer makes of "Kirby, Beard's" are less reliable than "Tayler's." As to substance of pins, both firms divide their various makes into two main groups (1) a stout make, (2) a finer make, in which most of the generally used sizes are duplicated. Kirby, Beard & Co.'s "stout" sizes are—1, 2, 3, 4, 5, 8, 9, 10, and "fine" sizes—14, 15, 17, 16, 18, 19, of which 14 is the length of 8, 15 of 9, 17 of 10, 18 and 19 of the same length as 17, but finer, whilst 16 is between 15 and 17 in length, but finer than either; Tayler & Co.'s "stout" sizes are 16, 11, 12, 13, 5, 6, 14, 17, 8, 9, and 10, whilst their "finer" sizes are 2 (agreeing in length with 16), 3 (between 11 and 12), 4 (12), 7 (17), 15 (rather shorter than 8), 19 (9), 18 and 20 (10). As to prices of silvered pins, we find, comparing pins of practically the same size and thickness, that, per ounce, the prices (liable, however, to variation, so that the sample-cards should be frequently referred to) are as follows:—

Tayler & Co.	No.	11	1/-	12	1/-	13	1/-	5	1/6	17	2/-	8	2/6	17	2/6
Kirby, Beard	No.	2	1/2	3	1/2	4	1/2	5	1/9	8	2/3	9	3/-	14	3/-
Tayler & Co.	No.	15	3/-	9	3/-	10	3/6	18	5/6	20	7/6	19	7/-		
Kirby, Beard	No.	15	3/6	10	3/6	17	4/-	18	6/6	19	8/6	16	7/-		

If gilt, or enamelled black, 1s. per ounce extra.

One supposes that all sizes are used by someone or other or they would cease to be made, still there are many lepidopterists who limit

the number of sizes used considerably. We use for large Sphingids, Lachneids, etc., no. 11 (2); for smaller Sphingids, Lachneids, etc., no. 5 (5); for larger butterflies, Noctuids, etc., no. 17 (8); for smaller butterflies, Noctuids, and larger Geometrids, no. 8 (9); for smaller Geometrids, Pyrales, Crambids, Alucitids, etc., no. 9 (10); for larger Tortricids, Tineids, etc., no. 10 (17); for smaller Tortricids and middle-sized Tineids, 18 (18); for very small Tineids, no. 20 (19); with some margin assumed for the application of a little common-sense. There are some pins one's experience teaches one to abhor, yet others use them and find delight therein. No. 15 of both makers are our own *bête noir*. We used to use no. 15 for Geometrids, but one year, we struck a bad vein of "Kirby, Beard's," and hundreds of beautiful insects were hopelessly ruined; the following year, we struck a line of "Tayler's" no. 15 with heads of what seemed enormous size, and from then till now no. 15 have been "taboo" so far as we are concerned, yet, occasionally, an honoured friend will send a fair-sized Noctuid on such a pin, and one can only wonder why. There are, of course, collectors who, once they have placed an insect in position in their collections, never move it again in the course of their lives. Young collectors are kindly urged to remember that, in a working collection, insects are frequently moved and examined, and the necessity of a good pin must be self-evident.

Good pins! There are, if one likes, only two qualities of pins, good and bad. One may ask where "good" pins can be bought; but we have shown above that pins of the same maker vary, and this in the same batch. A pin is an individual, and has a value of its own; one buys pins in the mass, and must select his own good ones. He does this by buying his pins in the ordinary way, and then, as it were, settling the quality of them himself. He empties them out, not too many at the time, on a perfectly smooth sheet of white paper laid upon a level table, and then, spreading them with the fingers, places aside all those that are double or treble, *i.e.*, not absolutely separate, for these cannot be entirely "coated" with enamel; the eye, too, will readily detect others that are badly japanned. Then one wants to look out for (1) deformed heads (tending to produce a lack of uniformity), (2) hooked points (already quite useless for pinning an insect), (3) crooked shaft (a sure sign of a weak pin, and straightening is sure to crack the enamel); and, then, two points want dealing with, which can only be done with a large hand-lens, *viz.*, the examination of the pins for those with (4) points too fine, and certain to bend and turn up at a critical moment later), (5) points too blunt (likely to damage the insect and not enter the cork readily). Bankes says that if the lens be held in one hand, and the pin rolled with a finger, whilst attention be directed to the point of the pin, a rapid glance will show the nature of the point, and the sense of touch immediately discovers a crooked pin as the rolling takes place. This takes time, but, with practice, one soon gets accustomed to rolling the pin in the direction of the "accepted" or "rejected" heaps. The only question that arises is whether the result is worth the time, but when one has been the victim of some wretched pin giving way with a great rarity or even "unique" on it, one feels no doubt on this score. Besides, one need only do about as many as one is going to use at the time, in order to distribute the labour as much as possible; or the work can

be done in winter, when, as a rule, entomologists get more leisure than during the rest of the year.

The way in which certain batches of pins vary in quality is remarkable. Sometimes one will reject hardly 5 per cent. of the total; at other times, one comes across a bad line, and 20 or 30 per cent. will be found to be "wasters." Which of the makers provides the greater number of lines with a large percentage of rejected pins must be discovered by experience. We long since rejected certain sizes made by certain makers as totally incapable of producing an ounce of pins of good quality, without buying at least 2 ounces and rejecting half, which makes "good" pins of these sizes very expensive. Certain sizes appear to lend themselves to being much better manufactured than others. Such are Tayler's no. 8 and no. 10, more of which are used possibly than all other sizes by British lepidopterists. One need hardly note that a lepidopterist who makes some sort of selection for the insects he will place in his own collection but troubles nothing about those he will send to friends, is hardly acting up to the standard of doing as he would be done by.

Silver pins are also used. Heyden, of Frankfort, used silver wire for mounting his micros nearly 100 years ago. These prevent verdigris, but they are soft, and bend in a most unfriendly way, even when one appears to be using all possible care. Recently an alloy has been added to the silver, and they are now much harder. They are a great boon for the particular species that are unkeepable on black pins, and are now made in various sizes, of which nos. 6 and 7 are large enough for the most refractory Ægeriids, Nonagrias, Hydrœcias, and other internal feeders that produce grand crops of verdigris, whilst the finest are suitable for "Neps." and other minute insects. They are all headless, so that it is absolutely necessary to move them with forceps, and the absence of anything which may be really called a point makes the very fine ones anything but easy to handle satisfactorily. If the setting-board be of cork, it is absolutely necessary to first make a hole with an ordinary pin for its reception, but they enter readily enough well-dried elder pith and *Polyporus* blocks, and it has been suggested that the setting-boards for the tiny species might readily be made of these materials instead of cork. Granted that the objections here could be better met, or if only the mode of pointing even could be improved, one could safely predict a much more general use of silver pins than at present. It has, of course, been partly met by Watkins and Doncaster, who have, as noted above, found an alloy that hardens the silver, so that the pins more recently made have a much better temper, and are much better pointed, than those made of pure silver, but greater improvement is still needed. The finer silver pins are made in five sizes, all of the same price, 1s. per 100 or 7s. 6d. per 1000. These are known as "Cap," "4/0," "3H," "0," "1," and are made in three different lengths, *viz.*, 8mm., 10mm., and 12mm., the lengths not affecting the price. The five sizes are popularly known as "Nep," "Lithocolletis," "Tinea," "Tortrix," and "Large Tortrix," and these, perhaps, give a good idea of their respective conditions of fineness, while the coarse sizes are nos. 3, 4, 5, 6, and 7, of which no. 3 are 1s. per 100, or 8s. 6d. per 1000; no. 4 are 1s. 6d. per 100, or 12s. per 1000; no. 5, 2s. per 100, or 18s. per 1000; no. 6, 3s. 6d. per 100, or 33s. per 1000; and no. 7, 4s. 9d.

per 100, or 44s. per 1000. Of these, one would suggest no. 3 as the best for Tortricids and Alucitids, no. 4 for Geometers, nos. 5 and 6 for Noctuids and butterflies, and no. 7 for large Noctuids, Sphingids, etc. Of the "fine" sizes, those of our collectors who set pretty high on the pin use the pins 15mm. long, and then cut down to the right length, just before setting, with a pair of scissors. Few use anything less stout than no. 1 if the insects are to be put into a cabinet in the ordinary way, but the finer ones can be used well with pith or fungus mounts, and an ordinary pin for a carrier. In spite of their drawbacks, these pins are extremely useful for Tortricids, etc., that are liable to grease; in fact, it is the only way to keep series of Alucitids, Dichroramphs, Eupœcilias, Tineids, Ochsenheimerids, certain Gelechiids, etc., at all permanently; of course, they do not prevent the abdomen, thorax, or imago from having their appearance spoiled by grease, but they make verdigris, and the consequent destruction by this, quite impossible. The pins, of course, do not keep their bright colour, and go dull after a time, but the contrast between the appearance of the thorax of a Lithocolletid pinned with a fine silver pin, and the same species, pinned with a fine ordinary entomological pin, white, or gilt, or black, which, nevertheless, makes such a large hole that scarcely any thorax is left visible, is most marked. In this case, certainly, a fine pin is absolutely necessary, and a fine silver one seems to be the most suitable. Bankes says that sizes 0 and 1 can be recommended, of the finer sorts, to the ordinary Micro collector; Sich states that he uses size 4/0 for Lithocolletids and Nepticulids, and either nos. 1 or 3 for larger Tineids, Gelechias, Plutellas, etc., and 15mm. or 13mm. long.

It is to be recommended that all Tortrices and Tineina be pinned with silver pins and mounted on cards, or, better perhaps, on "pith," with a long stout pin driven through the card or pith as carrier. The "pith" may be artichoke pith, or, far better, small blocks of *Polyporus* (*P. betulinus*, and perhaps other species). This method of mounting brings the specimens nearer the glass of the drawer, and so a lens of stronger power may be used when examining them without removing the cover of the drawer; to the carrier pin the full label is attached, and this may be read without moving the insect; the long carrier pin prevents mites attacking the specimens. The silver pins and *Polyporus* blocks are, as far as we can learn, only to be obtained at the present time from Watkins and Doncaster.

For many of the smaller Nepticulids, although Tayler's no. 20 will usually do very well, and can be moved thereon fairly safely if the cork of the cabinet be really well-prepared, yet the modern method of mounting them on a slip of pith, or *Polyporus*, and driving a stouter pin through the pith, is to be strongly recommended, as it saves moving or handling these delicate pins any further. For this purpose, also, the "Minuten Nadeln" of the Germans are, however, sometimes used, but more than one well-known entomologist has complained bitterly of their rusting, and thus destroying the moths which had been set thereon. For the very small Nepticulids, such as *Nepticula acetosae*, *N. microtheriella*, etc., silver pins, however, are most desirable, for the thoraces of these tiny species are practically destroyed by the very finest of the entomological pins made. But whether "no. 20" or the "Minuten Nadeln" be used, it is the only safe plan to fix them into pith (several may go on one strip) and use a stronger pin, say a Tayler's no. 8 for a carrier. Usually a "white" pin, not "black," is used as a carrier.

CHAPTER V.

Setting Lepidoptera.

Setting, *i.e.*, the so-called British setting, is quite a thing apart. In no part of the world is "setting" performed as in the British Isles. In all other countries lepidoptera are placed high on the pins, set uniformly flat so as to be comparatively near the glass of the cabinet drawers, and so far raised from the floor that damage to the specimens by mites, etc., cannot easily take place. In spite of the advantages of this high setting known as the "Continental" style, it is absolutely taboo among purely British lepidopterists, and, even an attempt to meet this halfway by pinning, on the usual British pins, the insect well up the pin, and set quite flat, is quite out of court, the specimens generally being refused in exchange by many of the best British lepidopterists. Low, curved, setting, then, is a peculiarly British institution, has survived endless attacks on its position, and remains more firmly fixed than at any previous time, as the one and only method satisfactory to the great mass of British lepidopterists. We shall not pretend, therefore, to give a detailed account of all the various modes of setting, but just enumerate a few hints as to setting lepidoptera well in the acknowledged British style. We have already stated that the first step towards good setting is to see that all the specimens on a board have the pins perfectly straight, leaning neither to left nor right, and of exactly the same slope with regard to the insect. But before this even, another matter must be considered, *viz.*, setting-boards.

The setting-boards in general use are those that may be bought at any of our leading naturalists, but the objection to nearly all of them is that they are too rounded, so that, to get the right curve, a small insect has to be set on a moderately large board, and thus considerable room is unnecessarily wasted and expense incurred, for the price of a board is in direct proportion to its width, all being of the same length, *viz.*, 14 ins. Our largest moths rarely cover more than 4 inches, and those that reach this are, as a rule, very few, and yet one wants a 5 inch or 5½ inch board on which to set them, so that the apices of the wings may not be too low, and this might be entirely obviated if the board, especially towards the outer edge, were less bevelled than is usually the case. What one really wants is a board just sufficiently curved to exactly take insects of the size of the board, without the apices overlapping, and without there being half-an-inch or more of board to spare on either side. Many of our best lepidopterists buy the ordinary boards, and then, during the winter, rub them down to the required curve by means of sandpaper. It is hardly worth the trouble from the point of view of expense, but is well worth it from the point of view of space. Another great objection to the present type of boards is the groove; it is usually made of only one depth and width for the same sized board, but one need hardly point out how much deeper and wider should be the groove for a Lachneid, Sphingid, or Arctiid, of say 2½ inches expanse, than for a Geometrid, Papilionid, or Lithosiid of the same wing-measurement. In this direction then, it often

happens that the boards want modifying; and, certainly, from 1½ inches to 3 inches, one wants three-sized grooves, one for slender-, a second for medium-, and a third for large heavy-bodied species. The groove, generally speaking, should only be wide enough to easily hold the body of the insect, the thorax being the widest part, and so that it rests easily with the wing-bases free from the top edges of the groove. Many lepidopterists will not have their boards papered, urging that, thus covered, they cannot be occasionally washed with dilute carbolic acid to keep them free from mites, whilst the paper gets very rough from continued use; the pins used for setting leaving numberless roughnesses that do not tend to improve the specimens. The surface of the paper, if the latter be used, should, therefore, continually be rubbed down to get a smooth surface, and, with occasional care, one should not suffer from any of the little evils consequent on badly-kept, and ill-prepared, setting-boards. Fenn states that the average British collector requires boards as follows:—5in. (2), 4in. (2), 3½in. (3), 3in. (4), 2½in. (6), 2in. (12), 1¾in. (12), 1½in. (12), 1¼in. (12), 1in. (10), ¾in. (8), ½in. (4). Of course, much depends on the limitation of one's collecting, *i.e.*, whether one is collecting a special group, or, as one would strongly advise all beginners, the smallest as well as the largest lepidoptera. At any rate, the number of boards given above in brackets, in the sizes mentioned, will allow one to set anything from *Manduca atropos* and *Papilio machaon* to small Tortricids and Tineids.

Assuming, then, the setting-boards to be satisfactory, and the insect well pinned, the pin carrying the insect should be inserted in the middle of the groove, inclining very slightly, but almost inappreciably, forwards; then pass a setting-needle down both sides of the thorax and abdomen to draw the second and third pairs of legs out of the way of the wings. Press the pin down until the insect rests easily in the groove, with the bases of the wings beneath raised very slightly above the level of the board. This prevents "springing," which usually occurs when the bases of the wings are slightly below the level of the setting-board at the point where the thorax rests. In this position the front pair of legs can be drawn out and placed in a natural pose, one on either side, whilst the hindmost legs can be placed so as to lie regularly on either side of the abdomen. We now come to the actual setting of the wings. Before this can be accomplished a spanner and setting-needle must be prepared.

The "spanner" is made in a variety of ways. The most usual and, perhaps, most effective, is constructed by a stout bristle being attached by a blob of sealing-wax to a rather long needle, at about ⅝in. or ½in. from the bottom. The bristle should be stout, stiff, perfectly smooth to the touch, and about 1½in. in length. It may be affixed to an ordinary darning-needle, which makes an excellent carrier. The bristle should come out nearly at right angles, although it is better to have a slightly obtuse angle formed between the bristle and the upper part of the needle, in order to get more leverage if required. This "bristle-spanner" is generally used for small insects; it occupies but little space, and covers such a tiny area of the wing, whilst its smoothness allows it to be placed down on the wing without injury to the scales. For larger insects, however, we invariably use a "quill-spanner." This is a long, narrow strip, about two inches long, cut out

of an ordinary quill in such a manner that the concavity of the quill runs evenly from end to end, lengthwise, down its centre, and tapering off gradually to a point. Through the broadest end of this quill slip pass a long stout needle, and fasten it to the quill with sealing-wax, or with a cube of cork glued tightly above it. This last precaution is necessary as the pressure of the needle on the front edge of the hole soon converts the latter into a rough elongated slit. The top of the needle, in each case, should have a knob of sealing-wax. This is the most useful form of spanner for the larger moths, and various lengths and thicknesses of quill will give sufficient variety for use in setting species as large as *Agrius convolvuli*, or small as *Cupido minima*. The "spanner" can now be used as a movable brace, which, placed across the wing, will hold down the costal nervure tightly, but, from its rounded form, does not in the slightest degree mark the wing. Increased pressure forwards on the needle will increase the leverage of the spanner on the costa, whilst the slightest pressure backwards will remove it altogether.

The insect being satisfactorily pinned and the wings lying either side of the groove, the spanner is pinned into the cork of the board near the groove, so that its base is behind the hindwing, and the "bristle" or "quill" extended over the wings, the tip touching the cork in front of the costa of the forewing. This completed, do the same with the other side, and, then, with the forefinger, press upon the needle so that the spanner exerts some little pressure on the costa of the forewing; the wings are now held firmly on either side. With the left hand gently press backwards the head of the "spanner," and, whilst the pressure on the costa is diminished, with a fine-pointed setting-needle (a sewing-needle fastened to a handle will do), touch the extreme base of the forewing, lifting it slightly forward or backward, as may be necessary to get a correct position; do the same with the hindwing, and see that both rest easily and naturally as you wish them to do when dried. Release the "spanner" so that it again presses forward, the pressure on the costa is renewed and the wings retain the position in which they have been placed. Now do the same with the other side, and then compare carefully the two sides, seeing that the forewings have been drawn forward to exactly the same position, that the angle between the fore- and hindwing is the same on either side, that the body is equidistant between the hindwings, and so on. If this be so, then the insect will have assumed on the board the exact position it is required to retain when set, and should now be braced down so that it may dry in this position.

The braces are made of smooth tracing-paper, and just a little in excess of the length of the area of the fore- and hindwings that are to be covered, whilst the width should extend from the position of the spanner to the hindmargin. Rectangular braces made thus, of different sizes, are really all that is needed, and they must thoroughly cover the margins and fringes of the wings. The braces ready, place one over the wings, already in position, pin it carefully at the top with two pins, one towards the base, the other over the apex of the wing, and then at the bottom, close to the anal angle of the hindwing, and, in the angle between the two wings, another pin should be inserted so as to carefully pull the transparent brace level over the wing. Sometimes, in practice, we exactly reverse this stage of the

process, putting a pin in the left-hand lower corner of the brace and fixing this near the anal angle of the right hindwing first, then, letting the brace fall over the wing, fix it as near the base, just above the costa, as is convenient, then fasten it over the apex, and finally place a pin in the angle between the fore- and hindwings, pressing it at such an angle as to draw the paper smoothly and evenly over both wings. Follow with the other side, and the spanners can be removed. The transparency of the braces shows if anything is not quite uniformly balanced or out of order; if there be, replace the spanners and rectify.

Some lepidopterists use a double setting-bristle instead of the separate ones. This is made by affixing two bristles, V-shaped, to the carrying-needle (handle). A piece of cork about ·2 in. cube, with two bristles firmly fastened therein with sealing-wax, and diverging somewhat from each other, and through which the carrying-needle passes, and extends below for about ·4 in., is all that is necessary. By its means it is claimed that both sides can be set at once. The insect is pinned on the setting-board in the usual way, the point of the carrying-needle in the groove behind it, so that the bristles pass forward over the wings on either side. Blow at the back of the insect's wings sending them forward, and, press the point into the board. With two well-balanced bristles, and a little practice, the wings will sometimes almost fall into position without further manipulation, but any irregularity—want of balance, evenness, etc.—in the two sides can be readily remedied by the setting-needle. The stiffness and length of the bristles should, of course, vary with the size of the specimen being set.

The final arrangement of the antennæ, abdomen and legs, now takes place, and pins are inserted where necessary. For the purpose of bracing, etc., we use the little common "doll's pins" or "Lilliputians," as they seem to be technically called, but some collectors use no. 20 or no. 18 white pins for setting (except beneath the body, where they utilise no. 15 white), so as to avoid unduly roughening the surface and the grooves of their setting-boards. Under this system forceps are of course absolutely necessary for placing every pin in position. Great care should be taken to have the body quite straight, the antennæ at the same angle, and the front and hind legs showing evenly on either side. Attention must also be paid to the position in which the board is placed during the time that the insect is drying, so that the body hangs or rests naturally. During the process of drying, a glance should occasionally be given to see that the wings have not slipped, and that everything is going on satisfactorily.

The time that insects should remain on the setting-boards naturally varies according to the time of year (and temperature), the place in which they are kept, the size of the insect, and even with the killing medium. But insects must be left on the boards till thoroughly dry; this can easily be ascertained by touching the abdomen with the setting-needle; if it is perfectly firm, and does not give way to the pressure, it is pretty certain that the insect is dry, and quite ready for removal; insects that are removed before they are quite dry, are liable to spring, and the collector by a little judicious patience in this matter is saved much disappointment.

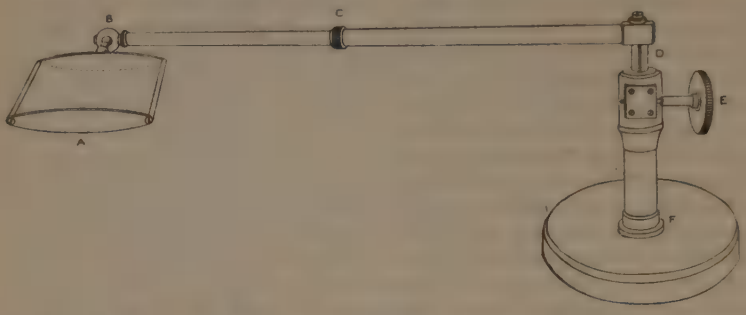
The mode of setting detailed above is by no means the only method adopted. Many lepidopterists still use the old-fashioned

triangular cardboard braces, which are pinned across the apical portion of the forewing, whilst another is pinned across the outer margin of the hindwing. Others use a modification of the method set out at length above, but, instead of separate braces, have one long piece of tracing-paper, which is used as a brace for all the specimens, but one is apt to raise slightly the lower edge of the part pinned over one specimen when setting the one next below, the wings slipping down, so that they have to be set again, and hence much valuable time is wasted. Another method is to run a fine smooth piece of cotton, tied at the top of the board (or let into a notch), so that it passes over and holds down the basal area of the wing; by this means the wings can then be put into position, and the cotton brought up at the back is again run down over the centre of the wing and yet again near the apex; a few pins judiciously placed so as to hold down the cotton more firmly on the wings are all that is needed. One can set moderately large species by this means very quickly, and, as the specimens can be pushed up pretty closely, space and time, two important factors, are in its favour. Against it is the tendency for the cotton to slip and rub off the scales, or, if too tight, to leave a mark on the wing, whilst, if too loose, the wings tend to fall back out of position. Experience, however, soon sets all these difficulties right, and one is sometimes astounded at the excellent results produced by what appear to be crude methods in the hands of those who have long practised them. Like killing insects, the method adopted earliest, and longest practised, is most successful in the hands of the individual.

Our own practice is varied. In our early days we always set macro-lepidoptera by means of cotton. Micro-lepidoptera were not readily amenable to the system, and we used the tiny triangular card-board braces. The collection of a large number of Noctuids with their thick easily-removed scales led us to adopt the rectangular transparent tracing-paper braces described at length above, and, except for an occasional lapse when we are setting a long series of some fairly large butterfly or geometer, when we occasionally adopt cotton, or small micro-lepidoptera, when we use triangular card-braces, we may say that we invariably adopt this method. It must be borne in mind, however, that careless habits do not pay, and that braces with pin-holes are a great danger to the specimen, that setting-boards get rough and want smoothing very regularly, and, if it be remembered that a well-pinned and well-set insect usually remains a thing of beauty and a joy for ever, it may be reasonably assumed that every lepidopterist will do his best to have his specimens in such a state, that they are a source of pleasure to himself and of admiration to his friends.

The setting of micro-lepidoptera is generally commenced by collectors who have already been some years collecting macro-lepidoptera, or increasing age, and difficulties of eyesight are frequently made an excuse for a collector never to make any study of the smaller species at all. Indeed, it is one of the standing complaints against our present day lepidopterists, that dozens make collections of the well-known larger species, killing thousands of specimens, without making any observations or increasing our scientific knowledge of the species sacrificed, whilst the smaller species, of many of which we have the merest elementary knowledge, never come within their observation. The difficulties of seeing the tiny species sufficiently well to manipulate

them satisfactorily has been largely met by Mr. J. A. Clark, who described (*Ent. Rec.*, vii., pp. 107-8) and gave a detailed figure of an instrument as an aid in this direction. We reproduce a diagrammatic representation of the instrument for our readers.



A, lens. B, hinge on which A works. C, hollow joint into which BC slides. D, ratchet which moves the crossbar DC up and down. E, screw to work D. F, heavy brass stand into which the upright is screwed. Scale = about $\frac{1}{5}$ actual size.

The instrument consists of a brass stand F, heavy enough to prevent any possibility of tilting, into the centre of which the brass upright DF is screwed. D is a ratchet working up and down so that the lens A may be raised or lowered. E is the screw by which the ratchet is elevated or depressed. The cross-bar is made of two hollow brass rods, the right-hand portion attached to the upright DF, the left-hand portion attached to the lens A. A slit in the left-hand part allows it to slip readily, under slight pressure, into C, and to remain firmly fixed there. The lens A works on a hinge at B, and is free to move in any direction. The focus of the lens may be adjusted by raising or depressing the lens by means of the screw E. To use the instrument for setting insects, place the setting-board under the lens A, look through lens at the insect you are about to set, focus by means of E, and then go to work in the ordinary manner. The magnifying power may be varied by the use of lenses of different powers, the one represented in the diagram enlarges objects from two to three times their natural size. The height of the top crossbar is amply sufficient to allow the right-hand to work beneath it. The instrument is made in three parts, *viz.*, (1) the base F, (2) the upright and cross-arm to C, (3) the lens and cross-arm from B to C. These fit readily into a small mahogany case, externally not unlike a microscope case. With this instrument small insects may be set with the greatest readiness and facility, and there can be no doubt that those, whose eyes are not so young as they used to be, have one excuse the less, when they attempt to justify themselves for not studying the smaller species, as the ease and readiness with which the instrument can be focussed for varying sights is such that it may be readily taken advantage of by all. Many microlepidopterists still, however, use a watchmaker's eyeglass, and these find it absolutely invaluable.

CHAPTER VI.

Labelling.

When the insects are thoroughly dried, they must be removed from the setting-boards, and can then be either packed away in store-boxes or placed at once in their position in the cabinet. Whatever is to be done with them, however, whether they are to be placed in cabinet or stored, they must first of all be "labelled." In days gone by, it was sufficient to know that a specimen was British, but the modern trend of studying local variation and its causes has made it absolutely necessary to give at least some data as to the "how, when, and where" of the specimens studied. The absolute worthlessness of collections without data, except in the case of the very rare British species, has been over and over again proved in the sale-rooms of recent years, when long series of perfectly-set specimens in the finest condition have hardly produced the value of the pins on which they have been set. Labelling, then, is a most important item in the scientific (and money) value of a collection.

The more scientific collectors have always kept data concerning their captures, but, in former days, this was generally by means of a diary, which, however useful it proved to the owner of the collection, was of very little service to the thousand and one entomologists who might come into possession of the specimens, when the collection found its way into the auction rooms. In such a case data with the specimens are the only items that are really valuable, and on which reliance can be thoroughly placed. The diary should still, of course, be maintained; in it, under each date, should be noted (1) the names of the insects captured, (2) the kind of weather, (3) the locality, (4) the mode of capture, (5) particular observations concerning the habits, abundance or rarity of individual species, etc. In this way the diary becomes an extended and detailed book of reference for the species in the collection, and the collector soon obtains a really scientific knowledge of his collection. It must be, however, quite evident that the diary can in no wise replace actual "labelling." In a short time the diary becomes bulky, the data more difficult to find, and, when the collector commences to exchange and details of his specimens are required, the data may not be readily found, and trusting to memory is a poor substitute for scientific accuracy. The diary, too, may be mislaid or destroyed, and all this valuable information may be lost, and the collection, from a scientific point of view, rendered worthless. This can never be the case when the insects in the collection are labelled. So much information, at least, as is on the label, must be retained as long as the specimen lasts.

Many lepidopterists now make their own labels either by hand or by means of a small hand printing-press. A small rectangular piece of paper, tiny enough not to appreciably detract from the appearance of the specimens, will comfortably contain the locality and date of capture, and such labels are made (or bought) by many lepidopterists, and are in general use. But, although the label will always be attached to the actual specimen in a thoroughly good arrangement,

our insular method of setting makes it absolutely necessary to take a specimen from its place in the cabinet drawer (or elsewhere) and turn it over so as to see what is written on the label; even then the information should be placed downwards towards the paper of the drawer, so that, when the insect is turned towards the enquirer, the information can be read without need of taking the label from the pin; in this way there will be a minimum of risk in handling the specimen. For ourselves, time and opportunity have always been wanting to deal with our large private collection in this individual manner, and our method has been the simple one of placing a label at the side of, and just on a level with, the lower edge of the last specimen of any section of a series of each species taken on the same day. This obviates removal; and it is evident that a label, pinned clear of the insect, the pin of the label adjacent to the division threads or lines separating the rows of insects in the cabinet, is easily read, and a minimum of time occupied in the process, an enormous advantage to one who uses his collection for work and not merely as something pretty to look at. The ideal method is, of course, to label each specimen individually, and also to add the side label for general use as above noted. To pin the labels which are used at the side of the specimens in position, what are called "points" should be used. They are tiny pins made without heads, much smaller, and having a much neater appearance than any small, headed pins could possibly have.

Various methods of labelling, some more or less simple, others complicated, and yet others simple enough to the holders of the key to their intricacies, but complicated enough to the outsider, have been adopted. Figures, letters, variously coloured papers, &c., representing geographical areas and geological districts, and other important facts, have been devised. To this has been added a variety of shapes, so that the label is square, triangular, round, &c., according as the specimen has been taken in the larval, pupal or imaginal stage; whilst "n" for captured with the net, "l" captured at light, "s" captured at sugar, and other cabalistic signs have been suggested. A simple addition was suggested (*Ent. Rec.*, xv., p. 98) to the ordinary label of the letter I, which represented "imago," and could easily be changed to "E"=egg, "L"=larva, or "P"=pupa, by the addition of the extra strokes, and designating whether the individual was taken as "egg," "larva," "pupa," or "imago." For ourselves, "ex ov. 26. ix. 07. Deal," serves all purposes for a specimen bred on September 26th, 1907, from eggs taken at Deal, or "ex l. 25. v. 07. Folkestone" for a specimen reared May 25th, 1907, from a larva found at Folkestone. We quite admire the skill and ingenuity that have been spent on the perfection of "labels" and "labelling" of recent years, and one would suggest that, if practical knowledge were required as to various methods, one could not do better than visit the downstairs collection of lepidoptera in the "student's room" at the Natural History Museum, South Kensington, or, better still, the collection in the Hope Museum, Oxford.

The importance of labelling, after all, is to have an effective answer to the questions "How?" "When?" and "Where?" of each specimen. If this is obtained the method can be held to satisfy all ordinary requirements. It is supposed by some that an "universal" system of labelling is desirable; a really clear and efficient method is

much more important. Uniformity, however desirable, is quite secondary to the fact that accuracy of detail is obtained by the method adopted, and that "errors" and "blunders" are reduced to a minimum. It has been laid down as a sort of general rule among our leading lepidopterists that, whatever other data may be desirable, the most important to retain are (1) the exact locality, (2) the exact date, (3) the name of the collector, the latter particularly in the case of insects not caught by the owner of the collection. As we have already noted, exact and reliable data add considerably to the value of an insect, and, in our present mode of amassing a collection largely by exchange, it is clear that, without knowing the actual captor, one does not know the amount of authority to attach to an insect so obtained. Discussions on this subject may be referred to in *Ent. Rec.*, iv., pp. 55; vii., p. 203; xv., p. 98, etc.

In labelling micro-lepidoptera the name of the insect should be placed on the label as well as the data, as many species are hard to identify, and, if accidentally misplaced, much time may be wasted in renaming such specimens. If the examples be bred it is important in the case of Micros to add the name of the food-plant of the larva.

One may safely conclude by asserting that a specimen is at its maximum value when in "fine condition," "well-pinned," "well-set," and "labelled" with the place and date of capture.

CHAPTER VII.

HOLIDAY COLLECTING.

Although the greater part of one's collecting is necessarily done in the more or less immediate neghbourhood of one's home, yet, as opportunity offers, advantage is taken to collect elsewhere. Usually, such opportunities are limited both in number and extent, and one naturally wishes to take the greatest possible advantage of them. It is, therefore, necessary for the collector to know as much as possible of the place he is visiting, what it produces, where are the best hunting-grounds, etc., for, as is well-known, insects are not found everywhere, and, even in places with the best reputation for collecting, one may waste a whole holiday through not finding out the special spots to work. Such information is, particularly to a beginner, very hard to find. Yet almost all these places have been well written up in the entomological magazines by different generations of collectors, and the lepidopterist who, before visiting a place, would take the trouble to work through a series of any one of the entomological magazines, would find himself well equipped beforehand to get the maximum from the district he was visiting. For example, taking *The Entomologist's Record*, etc., with with we are most conversant, a visitor to Scotland, the coast of Sussex, the coast of Kent, the Isle of Wight, Norfolk Broads, Wicken Fen, or, in fact, almost anywhere, has only to look up the "Geographical Index" to find a fund of information. Thus we are indebted to the Rev. C. R. N. Burrows for the following

details illustrating the point discussed (the Roman numerals representing the volumes of the *Ent. Record*, the Arabic numerals the pages):—

Cornwall (iii., 287 ; xiii., 366; xv., 107); Bude (xii., 312); Penzance (xi., 317). Epping Forest (i., 249 ; ii., 231 ; iii., 82, 114, 133, 165 ; iii., 115, 179, 263 ; viii., 214 ; xii., 23 ; xiv., 50); Broxbourne (ix., 295); Chingford (xiii., 302).

Isle of Wight (i., 131, 251 ; ii., 181 ; iii., 180, 182, 203, 235, 237 ; iv., 209, 252, 253 ; v., 208 ; xv., 156); Freshwater (iv., 337 ; v., 229, 274, 303); Sandown (iv., 278 ; v., 227, 274 ; ix., 296).

Kent coast districts (iii., 284) ; Chatham district (i., 207 ; ii., 111, 232 ; vii., 90 ; x., 100); Chattenden district (iv., 228, 249, 275 ; xvi., 294); Deal (i., 129, 203, 244 ; ii., 203); Dover (i., 203 ; ix., 267 ; xiv., 274 ; xv., 269); Folkestone (ix., 91 ; xii., 272 ; xiv., 274, 275, 304 ; xv., 189, 269); Hythe (vii., 86 ; x., 182, 228); Rochester district (xviii., 17) ; Wye (ii., 290 ; xv., 306).

New Forest (i., 130, 287 ; ii., 135, 184, 236 ; iii., 209, 234, 261, 264, 290, 292 ; iv., 10, 152, 180, 183, 213, 301 ; viii., 138 ; ix., 62, 92, 210, 296 ; x., 53 ; xi., 51, 193, 210, 223, 224 ; xii., 300 ; xiii., 220, 248, 276, 301, 369, 372 ; xiv., 272 ; xiv., 287 ; xvi., 23) ; Brockenhurst (ii., 135 ; xi., 193) ; Lyndhurst (i., 207 ; ii., 182 ; iv., 151, 213 ; xii., 189, 340 ; xiv., 164); Romsey (xvi., 22).

Norfolk Broads (ii., 225 ; x., 206, 231 ; xi., 259 ; xii., 271, 301 ; xvi., 24, 50); Horning (xi., 26).

Scotland : Aberdeen (i., 103, 155, 157 ; ii., 61, 86, 111, 180, 231, 253 ; iii., 161, 257, 287 ; iv., 234 ; v., 182 ; vii., 92, 161, 204 ; xii., 282); Bræmar (iv., 234 ; vii., 92, 204) ; Elgin (ii., 63) ; Forfar (v., 301); Fife (xvii., 23); Forres (ii., 180 ; v. 270 ; vii., 92 ; xii., 282); Glasgow district (vii., 159); Inverness (i., 308); Kincardine (vii., 92, 204 ; xvi., p. 332); Lanark (iii., 210 ; iv., p. 277); Luss (vii., 14); Midlothian (iii., 185); Montrose (vii., 92, 220 ; viii., 16); Moray (i., 155 ; iii., 233 ; iv., 234 ; vii., 204); Oban (xi., 13) ; Orkneys (vii., 164 ; ix., 93 ; x., 83, 204); Perthshire (i., 206 ; vii., 92 ; xiv., 271) ; Rannoch (iii., 129 ; viii., 143 ; x., 80 ; xviii., 189); Shetland (vii., 91) ; Sutherland (xiv., 302) ; Western Highlands (iv., 285 ; xiii., 135) ; Wigtownshire (x., p. 291) ; East Scotland (ix., 18); North Scotland (iv., 80 ; xviii., 92) ; Southwest Scotland (x., 81 ; xii., 104 ; xiii., 133) ; West Scotland (ix., 17).

Wicken and Chippenham Fens : Wicken (ii., 176 ; iii., 156, 196 ; iv., 176, 181, 208, 234, 253, 280 ; v., 180, 302 ; vii., 66, 90 ; ix., 296 ; x., 311 ; xii., 51, 233, 335); Chippenham (iii., 229 ; iv., 181 ; xii., 235)—

and so on, for almost every known locality of importance in the British Isles. Many details of the hunting to be done in the chief continental haunts are also to be found, for example :—

Alps : Basses-Alpes (xiv., 312 ; xvii., 65, 88, 190 ; xix., 153, 173, 197, 200, 201, 222); Digne (ix., 221 ; xii., 57, 93 ; xiv., 312 ; xv., 195) ; Carinthian Alps (x., 12); Carpathian Alps (xix., 245, 281) ; Dalmatian Alps (xi., 1) ; Dauphiny Alps (viii., 253 ; ix., 13, 52, 79, 140, 173, 202, 228 ; xix., 149) ; Hautes-Alpes (xii., 226, 258 ; xvii., 65, 88); Jura-Alps (xix., 228); Maritimes-Alpes (xv., 247, 277); Piedmontese Alps (x., 89, 118 ; xi., 226 ; xii., 324 ; xiv., 169 ; xv., 85) ; Courmayeur (v., 232); Susa (xi., 290); Italian Lakes (xi., 152 ; xii., 116 ; xiv., 214 ; xv., 155, 224); Savoy Alps (vi., 49, 169 ; viii., 233 ; xi., 169, 197 ; xiii., 88 ; xiv., 226, 253, 325 ; xv., 85 ; xvi., 34 ; xvii., 129, 144 ; xix., 225); Swiss Alps (ix., 25 ; x., 264 ; xi., 309 ; xii., 4, 81, 309 ; xiii., 95, 117 ; xiv., 58, 124, 289 ; xv., 57, 320 ; xvi., 12, 96, 104, 305, 330 ; xvii., 57, 188, 193 ; xviii., 113, 123, 174 ; xix., 42, 92, 103, 130); Aigle (xvi., 157); Airolo (xx., 49); Albula Pass (xix, 43); Arolla (xvii., 1); Grindelwald (xvi., 305) ; Goeschenen (xix., 269); Rhone Valley (x., 34 ; xii., 50 ; xv., 214 ; xx., 74); Roche (xvi., 118); Saas Valley (xvii., 174); Simplon (xi., 252); Val d'Anniviers (x., 281 ; xx., 54) ; Val d'Hérens (xvi., 146 ; xvii., 1, 208, 240) ; Tyrolean Alps (vii., 49, 221 ; xiv., p. 281 ; xviii., 144)—

and so on for Bosnia, Bulgaria, the Cevennes, Corsica, Egypt, Fontainebleau Forest, Hercegovina, Greece, the Riviera, Syria, the Lebanon, Lapland, Spain, etc. One is continually being asked where information concerning well-known localities is to be found ; one cannot suggest a better answer than the geographical indexes of the well-known entomological magazines—the burying-grounds of almost everything useful in lepidopterology.

JANUARY, FEBRUARY, AND EARLY MARCH.

During the winter months, little out-of-door work can be done by lepidopterists. Searching for eggs that are laid on twigs in autumn and do not hatch until spring, the completion of any work already begun in pupa-digging, much better done, however, in autumn, before the pupæ have been exposed to the thousand and one chances of destruction during winter, and before the pangs of hunger have made their vertebrate enemies search every available nook and cranny for food, the collection of leaves for mines of Lithocolletids, &c., searching beneath trees for cocoons spun up among the leaves in autumn and now fallen, stripping moss from tree-trunks for pupæ, collecting roots of various *Compositae* for various Tortricid larvæ that feed throughout the winter, are all occupations that help to fill up the lepidopterist's leisure. As, however, winter passes and spring slowly takes its place, other work is possible. The lamps give male *Phigalia pedaria*, *Hybernia marginaria*, &c., whilst searching tree-trunks produces the apterous females of the former, and it is worth while also looking over the still leafless hawthorn hedges with a lantern after dark for *Hybernia rupicapraria*, *H. marginaria*, and both hedges and tree-trunks for *Anisopteryx aescularia*, the wingless ♀ s of the Hyberniids being best beaten into an open umbrella, as they get well into the bushes to lay their eggs. The eggs of *A. aescularia* are laid round a twig, and completely covered with hairs from the anal tuft of the ♀, a characteristic which at once distinguishes it from its allies. At the foot of the hedges, Noctuid larvæ feed all through the winter when the weather is at all mild, and one can get a supply of excellent specimens of common species by collecting the larvæ in the slack season, rearing them, and breeding the imagines later in the year. As the end of March approaches, spring advances rapidly, and, with increased temperature, both vegetable and animal life make vast strides, and one may truly say that, often, in some three weeks, one has passed from lepidopterological stagnation to the full bustle of active collecting—larva-beating, sallowing, obtaining eggs from hybernated ♀ s, and such like work adapted to the accumulation of specimens and knowledge. It seems unnecessary to mention that eggs of *Thecla w-album* on elm, *T. pruni* on sloe, *Zephyrus quercus* on oak, are to be obtained throughout the winter on twigs near the base of leaf-buds; those of *Lymantria monacha* on oak, beech and birch, of *Poecilocampa*

populi, *Malacosoma neustria* on hawthorn, oak, birch, sloe, &c., and so on through all the species that pass the winter in the egg-stage, yet each has its own particular mode of oviposition, and it must not be forgotten that they are better found now than in autumn because the trees are leafless. Similarly with regard to pupæ, one might repeat the names of a large number of species which are much better dealt with in the autumn notes, *e.g.*, *Smerinthus ocellatus* at roots of willow, *S. populi* at roots of poplar, *S. tiliae* at roots of lime, and so on, although a few may be mentioned with the general assumption that many others are to be similarly obtained.

Tineina (unclassified).—During January and February collect mined oak and other leaves for the pupæ of Nepticulids, Lithocolletids, and Incurvarias.

Beat thatch—whether straw-thatch or chip-thatch—stacks of bracken and hop-haulm. Hold the net directly under the place beaten and catch everything that falls. Stacks of bracken, hop-haulm, reed, and thatch, shelter *Coriscium brongniardellum*, *C. cuculipennellum*, *Laverna decorella*, *Teleia humeralis*, *Gracilaria stigmatella*, *Depressaria ciliella*, *D. chaerophyllella*, *D. albipunctella*, *D. applana*, *D. arenella*, *D. carduella*, *D. subpropinquella*, *D. propinquella*, *D. heracliella*, *D. purpurella*, *Cidaria miata*, *Orneodes hexadactyla*, and many other species, and these may be sometimes beaten from such places in great abundance during the months of February and March.

Tineides.—The larvæ of *Teichobia verhuella* should be gathered during the winter and spring months. They mine in the leaves of *Asplenium ruta-muraria* and *Scolopendrium vulgare* (Hart's Tongue) and later feed on the indusia.

Coleophorides.—Collect the stems of sea-lavender (*Statice limonium*) for the larvæ of *Goniodoma limoniella* (*atriplicivorella*). These larvæ feed on the flowers, eating out one of the petals and using it as a case, in which the larva moves about till full-fed in December, then, crawling down the stem, it eats its way inside, covering up the small hole with a slight web, soon after which the case drops off (Elisha).

Larvæ of *Coleophora lineolea* are blotching the leaves of *Ballota nigra* and *Stachys sylvatica* in March; they are also found in gardens on a species of *Stachys* commonly called "Lamb's Ear."

Glyphipterygides.—Old stems of viper's bugloss (*Echium vulgare*) should be collected in the winter; *Douglasia ocnerostomella* will often emerge from these in abundance in June.

During the winter gather the seed-heads of cotton-grass; *Glyphipteryx haworthana* may be bred from them in June.

Lyonetiides.—Larvæ of *Bucculatrix cristatella* are to be found on leaves of *Achillea millefolium*. Care must be taken not to shake the plants or the larvæ will fall to the ground, and then are not easily to be detected. Later on the most beautiful white cocoons may be found spun on the leaves and stems of the food-plant.

Elachistides.—The larvæ of *Elachista stabilella* mine the leaves of

Aira cespitosa on chalk, and may be found in February in the brown withered tips of the leaves, from which they make pale yellow mines to the stem, pupating in April at the base of the blade, under an oval-shaped web (Warren).

Tortricides.—The larvæ of *Tortrix forsterana* can be found in March, between two leaves of ivy, spun flatly upon one another.

During the last week in February the larvæ and pupæ of *Ephippiphora scutulana* are to be obtained in thistle heads and stems.

Oak-galls collected in the winter give *Ephippiphora gallicolana* and *Heusimene fimbriana*.

During the winter, stems of *Stachys sylvatica* should be collected for larvæ of *Ephippiphora nigricostana*.

The roots of *Artemisia* should be collected in January and February for larvæ of *Ephippiphora foeneana* and *Dichrorampha simpliciana*.

Roots of ragwort (*Senecio jacobaea*) dug during the winter will give larvæ of *Ephippiphora trigeminana*, *Eupoecilia atricapitana*, &c.

Collect the seedheads of teasel (*Dipsacus sylvestris*) and keep in a bandbox; you will breed plenty of *Penthina gentiana* and *Eupoecilia roseana*.

The roots of corn woundwort (*Stachys arvensis*) should be collected in February for larvæ of *Orthotaenia antiquana*.

In March, with a fern scoop, dig up roots of thistles, plantain, ragwort, knapweed, dandelion, &c., for root-feeding larvæ. Place in flower-pots, &c. In this way, *Orthotaenia striana* (from dandelion) and many other species may be bred (Barrett).

A quantity of the common round oak-galls should be collected in March. They will contain the pupæ of *Coccyx splendidulana*, &c., the larvæ of many species spinning up in them.

Roots of tansy (*Tanacetum vulgare*), dug during the winter, give *Dichrorampha alpinana* and *D. saturnana*.

During February, pull gently the last year's flower-stalks of ragwort, and you will find that when the root contains a larva of *Argyrolepia aeneana*, the stem breaks off readily, leaving a piece about two inches high, which is slightly webbed over the hole that leads down to the root. Dig up the roots, plant in pots or boxes, and bring indoors in May.

Roots of *Daucus carota* should be collected in the winter months for larvæ of *Argyrolepia zephyrana*.

The larvæ of *Conchylis dipoltana* feed in a web among the seeds of yarrow in the autumn and winter.

In winter and early spring collect the stems of wild parsnip (*Pastinaca sativa*) for the larvæ of *Conchylis dilucidana*.

Small holes in the stems of *Daucus carota* indicate the presence of larvæ of *Conchylis francillonana*. Collect in January.

In January, collect a bundle of flower-stems of *Alisma plantago*, stand them out of doors till May, then put into a cage, and *Eupoecilia udana* should emerge from June to August.

Pyraloides.—The roots of *Artemisia* should be collected in February for larvæ of *Exaeretia allisella*, as the latter mine up the new shoots in early spring, causing them to die.

Larvæ of *Lita tricolorella* should be sought in spun-together tops of *Stellaria holostea*.

I observed the larva of *Butalis grandipennis* in the greatest profusion on the furze-bushes on the steep hill-sides between Torrington and the river. The webs were, in February, quite a feature in the landscape (Stainton).

During March *Diurnea fagella* can be obtained in plenty in parks and woods on tree-trunks; the dark aberrations want searching for closely; the ♀ s are best obtained with a lantern after dark when they are often found on the move up the tree-trunks.

Pyralides.—During February and March the larvæ (some almost full-fed) of *Scoparia angustea* are to be found by pulling off the moss on the surface of rocks and old walls.

Crambides.—Full-fed larvæ of *Myelois cribrella* may now be found in dead thistle stems; they are most partial to those of *Cnicus lanceolatus*.

Euzophera cinerosella (*artemisiella*) feeds throughout the winter inside the root-stalks of *Artemisia absynthium*.

The larvæ of *Crambus falsellus* feed on and among the moss growing on walls, rocks, &c.

Brephides.—*Brephos parthenias* flies freely in bright sunshine round the tops of birch trees, in which position it is difficult to obtain, but by standing in an open space between the trees, it is readily secured, as, in passing from tree to tree, it comes considerably nearer the earth; out by mid-March only in early seasons.

Geometrides.—Eggs of *Ennomos autumnaria* on alder, birch and sallow; of *E. tiliaria* on oak, sallow, birch and alder; of *E. fuscantaria* on ash and privet; of *E. erosaria* on oak, birch, beech, &c. Usually in small batches a few laid side by side along a twig.

Pupæ of various species may be obtained throughout January and February under moss on trees—*Eurymene dolabraria* on oak; *Odontopera bidentata*, various trees; *Tephrosia consonaria* near roots of beech, oak and birch; *T. bistortata* on alder, birch, willow, &c.; *T. punctulata* on birch; *Eupisteria obliterata* on alder; *Eupithecia fraxinata* on ash, &c. Many of these are almost certain finds.

Other pupæ are to be found among the *débris* at the foot of trees—*Zonosoma porata* at oak, *Z. punctaria* at oak and birch, *Z. trilinearia* at beech, *Z. pendularia* at birch, *Numeria pulveraria* at sallow, &c.

Others are to be dug at the foot of trees, having pupated underground—*Nyssia hispidaria* at oak, *Selenia bilunaria* at willow, oak, &c., *S. lunaria* at sloe, oak, nut, &c., *Biston hirtaria* at lime, *Amphidasys strataria* and *A. betularia* at oak, elm, &c.

I used to have much difficulty when breeding lichen-feeding larvæ in pots, owing to the contents becoming mouldy. I have since adopted the following method with success:—In a damp and somewhat shaded part of the garden I suspend by means of a wire, between two branches of a tree, a glass cylinder (such as those used on candlesticks), or a small garden pot, and cover it with a large muslin sleeve tied to the wire towards both ends; in this way the food is kept healthy by

exposure to air and moisture, and the larvæ can always get shelter; by this means I have bred, *ab ovo*, *Cleora lichenaria*, &c. (Riding).

The larva of *Cleora lichenaria* is always worth looking for in February and March (as well as later) on the lichen-covered fences and trees it loves to haunt. It is rather fond of sunning itself on bright days.

You can also beat lichen-covered thorn-bushes and the low branches of oak, apple and beech trees for larvæ of *Cleora lichenaria*, and search the long hoary lichens on old beeches for larvæ of *C. glabraria*. From the thorns will also be beaten larvæ of *Miselia oxyacanthae* (Moberly).

A mild evening in January or February will be sure to give *Hybernia rupicapraria* if hawthorn hedges be searched soon after dark with a lantern (this species is usually going over when *H. marginaria* commences to appear). *Phigalia pedaria* is also sometimes abundant, the males being attracted to the lantern.

When searching for *Hybernia leucophaearia* in February, it is well to remember that the imagines appear usually to emerge between 10 a.m. and noon, and can then be found drying their wings on tree-trunks, fences, &c.

The imagines of *Hybernia marginaria* are to be found after dark from late January onwards, sitting on the bare twigs of hedges and the bushes in woods—hazel and hawthorn appear to be preferred.

Aleucis pictaria appears with the first fine days of spring, flying in the evening about the sloe-bushes in flower (Guenée); rarely appears so early as March in Britain except in exceedingly forward seasons.

In mid-March the imago of *Nyssia zonaria* may, in mild seasons, be already found resting on the bare sand on the sandhills of the Lancashire coasts. It emerges from the pupa about 3.0 p.m. (Birchall).

A female *Amphidasys strataria* enclosed in a small muslin bag (3in. diameter) and hung in a sheltered position on the outskirts of a wood will attract males in suitable weather from 10 p.m. to 12 p.m. (Alderson).

By the middle of March those who want *Tephrosia bistortata* should commence to search the tree-trunks regularly, especially if the weather be mild.

From February onwards the pale coloured larva of *Boarmia repandata* is very conspicuous at night on sloe and bramble twigs.

From mid-March beat Scotch fir, which will yield larvæ of *Thera variata*, *Ellopia prosapiaria* (*fasciaria*), and, in some localities, *Boarmia abietaria* and *Aventia flexula*.

The larvæ of *Gnophos obscurata* are to be found in January on *Geranium lucidum*, &c., by searching at night with a lantern, and may be so found until the beginning of April, when they are nearly full-fed. They then prefer flowers to leaves.

The pupæ of *Hypsipetes ruberata* should be searched for on willow trees. The angles made where the boughs branch from the trunk are the favourite places for pupation.

Sesiides.—The twigs of currant bushes (cut the previous year) should be overhauled in February and March for the larvæ of *Sesia tipuliformis*. The cocoons will be found not far from the end of the shoot; keep the cut twigs in damp sand.

The larva of *Sesia myopiformis* feeds just under the bark in trees that are suffering from canker, or that have been injured by the rough removal of branches (Fenn).

In February, where one knows osiers or sallows are being cut down, look over the cut sticks for the burrows of *Trochilium crabroniforme*: the larvæ rarely get more than a foot or so from the root; keep the cut sticks in sand with holes downward; the moths emerge the first fortnight in June.

Psychides.—Cases containing larvæ of *Narycia monilifera* (*melanella*) are to be found by diligently searching the lichen-covered trunks of various trees; also on lichen-covered rocks.

Larvæ of *Luffia ferchaultella* are on the move in early March if the weather be mild, on fences, tree-trunks, &c., covered with suitable lichens.

The cases of *Solenobia inconspicuella* and *S. lichenella* on similar lichen-covered tree-trunks, fences, &c., should be collected as soon as they are ready for pupation.

Lachneides.—Late imagines of *Poecilocampa populi* are still to be obtained at light, if mild, during the first fortnight of January.

Eggs of *Trichiura crataegi* are laid in rows, side by side, on branches of sloe, hawthorn, sallow, birch, &c.

Eggs of *Malacosoma castrensis* are to be found on the shores of the Thames and Medway marshes, directly under the sea-wall, where the egg-rings have been washed up by the winter floods.

Collect larvæ of *Macrothylacia rubi* on sunny days in the early spring. Put each one separately into a small box (large enough, however, for the moth to emerge and expand its wings); put the boxes into a warm kitchen; the larvæ will spin up and the imagines emerge in due course without further trouble.

The imago of *Lachneis lanestris* emerges in February and March, and is to be found resting on hawthorn, the wings wrapped round the twig, and thus exactly resembling a dead leaf.

The eggs of *Lachneis lanestris* are laid on hawthorn twigs, &c., in March, the bulky, roughly spindle-shaped mass, covered thickly with scales from the abdominal tuft, is usually not difficult to spot, as it often measures an inch and a half or two inches from end to end.

Sphingides.—Pupæ of *Smerinthus ocellatus* and *S. populi* may still be dug at the roots of willows, poplars, &c., those of *S. tiliae* at roots of elm (a large hollow in an old elm-trunk is generally sure to harbour several pupæ of the last-named species).

Some Sphingid pupæ can readily be forced through January and February. Place them in a large flower-pot on sand (well-baked before placing in pot) and cover with moss; cover with muslin and place the whole on the kitchen mantel-piece; keep fairly damp.

Notodontides.—Cocoons of *Lophopteryx camelina* and *L. carmelita* are subterranean at foot of birch, *L. cucullina* at maple and sycamore, *Pterostoma palpina* at willows and poplars; of *Leiocampa dictaea*, at poplars and willows, and *L. dictaeoides* at birch; of *Notodonta ziczac* at

poplars, sallows, and willows; of *N. trepida*, *Drymonia chaonia*, and *D. dodonea* at oak.

Dead wood on or about the roots of sallow-trees, should be searched for the cocoons of *Cerura furcula*: they are often also at the base of a branch, or in a hollow where a branch has been pulled off. Those of *Cerura bicuspis* on alder and birch, of *C. bifida* on poplar.

Eggs of *Ptilophora plumigera* on maple, chiefly on the twigs, in hedges not shaded by trees; often singly but sometimes in clusters of two, three, or many more; circular, smooth, brown above, whitish beneath (Merrin).

Early hatching (January and February) eggs of *Asteroscopus sphinx* can be reared on birch catkins by cutting the latter open; the larvæ will not touch the catkins unless split (Greene).

Arctiides.—The fluffy spider-web-like cocoons of *Gnophria rubricollis* are spun under moss on oak-trees.

Cocoons of *Spilosoma mendica* are to be found under moss on trees bordering ditches (Merrin).

Lymantriides.—Cocoons of *Dasychira pudibunda* are to be found spun up among dead leaves, &c., under various kinds of trees.

Noctuides.—A small supply of calico bags is one of the most important items in the lepidopterist's outfit. They are infinitely better than tins for many larvæ, especially those feeding in flower- or seed-heads, rolled leaves, &c.

Beating and searching for larvæ by night—both in spring and autumn—are much more profitable than beating by day.

Cocoons of the Acronyctids are spun up in hollows and crevices on the bark of the various plants on which they feed:—*Triaena tridens*, on hawthorn, &c.; *T. psi*, on fruit-trees, &c.; *Acronicta leporina*, on birch and alder; *Apatela aceris*, on horse-chestnut, maple, and sycamore; *Cuspidia megacephala*, on poplar, &c.

Pupæ of *Moma orion* are enclosed in cocoons of rotten wood on bark of birch and oak.

Cocoons of *Craniophora ligustri* are to be found spun up under moss on ash-trees and under top stones of walls or other suitable place near privet bushes. The cocoons are very hard, and feel lumpy when spun under moss on ash-trunks, or, if ivy be on the trees, they will be found adhering to the rootlets; the moss should not be pulled off, as it spoils the trees for another year.

Search the stone dykes which fence the fields in Scotland (Aberdeen, Moray, &c.) for pupæ of *Arctomyscis* var. *myricae*. The larvæ spin up on the stones, the cocoons being easily seen.

In March the larvæ of *Heliophobus hispidus* are to be found by night. The larvæ of *Stilbia anomala*, *Agrotis lucernea*, *Epunda nigra*, *E. lichenea*, and other species, are also to be found at the same time in suitable places. Torquay is a well-known locality for all these species.

The larvæ of *Heliophobus hispidus* are nearly full-fed by the middle of February, and may be obtained resting on the grass in the evening in their known haunts; they cling tightly when disturbed, and do not drop to the ground; they feed only at night, burying themselves in

the earth by day; in confinement they enter a sod of grass if one be available, and, as there is risk of injuring them by breaking the sod, fresh grass every day cut close to the roots and scattered in the box, the accumulated waste being cleared out every few days, proves satisfactory, and they pupate well (Brown).

The eggs of *Gortyna ochracea*, laid in heaps, are to be found on marsh-thistles, burdock, &c. (Merrin).

The larvæ of *Apamea unanimis* are to be found from January to March under the bark of old trees on the borders of marshes, &c. They are also to be found in March and April among grass at the roots of willows in similar places.

January and February (if the weather be mild and damp) is the season to take the larvæ of *Triphaena subsequa* (*orbona*). I took it first, early in January, 1874, by sweeping tufts of *Dactylis glomerata*, and afterwards at night, feeding on the common *Triticum repens*, and it was seen still feeding on grass as late as April. It is nearly half-grown when *T. orbona* (*comes*) is very small (Williams).

Mild evenings in February give larvæ of *Triphaena orbona*, *T. ianthina*, *Leucania litharyyria*, *Phlogophora meticulosa* at the base of hedges; they are easier to find now than later, the vegetation being less thick (Mathew); larvæ of *Leucania litharyyria* are sometimes especially abundant in these situations.

Agrotis lucernea larvæ hide in daytime in isolated tufts of grass growing in clefts on bare cliff faces. On February 12th they are large and not far from full-fed. Look for them at night with a lantern (Kane).

To rear larvæ of *Agrotis agathina* plant in pots some shoots of *Erica cinerea*, surround the shoots with moss to serve as a hiding-place for the larvæ during the day, place 12-15 larvæ in each pot, cover the whole with a carefully-fastened gauze bag, place the pot in a saucer full of water, and the whole out in the open air, a most important factor for success; leave the pots in the sun, but they must be protected against heavy rain. After about a fortnight they want attending to, the moss lifted and searched with care so that no hidden larvæ be thrown away, the grass cleared, fresh moss added, and the larvæ placed back. If the heath be too much eaten a fresh piece must be planted. When full-fed the larvæ prefer to spin up between the stems of the heath almost on the ground; once they have buried themselves the pot need not be watered regularly, it is sufficient to place it in a saucer full of water and replenish the latter about once a fortnight to prevent the earth drying up entirely. The pots should now be kept in the shade, and, after July 20th, carefully watched for the imagines, which emerge from this date till about September 8th (Léon de Joannis).

Dasypolia templi hybernated females laid ova March 1st and 6th-13th. The larvæ emerged from April 5th, transparent yellow with black heads. Some burrowed into the leaf-stem of *Heracleum sphondylium* (cow-parsnip), two others spun a slight silk protection and devoured the cuticle of a leaf. By April 13th nearly all were hidden in the leaf-stems. On June 18th found a full-fed larva (stung, however, and full of a mass of small maggots) under a stone near Athlone. Howth is also a locality (Kane).

Many subterranean pupæ are to be still found at the foot of

various trees, *e.g.*, the Tæniocampids, Hadenids, &c., the Dianthœcias near *Lychnis*, *Silene*, &c., and the Cucullias near *Verbascum*, &c.

The purplish-brown eggs of *Polia chi* are to be found on dock, hawthorn, sallow, and probably lettuce, sow-thistle, tea-tree, &c. (Merrin).

The eggs of *Polia flavicincta* are to be found on dock, chickweed, groundsel, mint, &c., and in gardens on everlasting pea, plum, &c. (Merrin).

In Portland the green larvæ of *Epunda lichenea* are to be found from the middle of February to the end of April, at night, on the top of grass-stems, dock, twigs, &c., the smallest in a Sphinx-like attitude, generally in little groups of five or six, in sheltered spots at the foot of banks, beside large boulders, or in the crevices of the rock; those that were feeding ate dock, sorrel, chickweed, and a common sort of grass. When older they become olive-coloured, and hide among the roots of low plants (Brown); also at Torquay and other localities.

The larvæ of *Stilbia anomala* are best found at the end of February by the aid of a lantern, for they feed quite exposed at night on grass (Norman).

Eggs of *Tethea subtusa* are to be found on poplar twigs near leaf-buds; those of *T. retusa* on sallow and willow, near the base of the old leaves or base of a leaf-bud.

Those well-placed for sallowing should commence work as soon as the earliest sallows are in blossom. The Tæniocampids and hybernated *Dasycampa rubiginea*, *Hoporina croceago*, *Xylina semibrunnea*, &c., are on the move as soon as the earliest catkins show. The pistillate catkins are just as attractive as the staminate ones.

Always sugar in the spring when sallowing, for *Dasycampa rubiginea*.

Never forget in March and April to fill several large linen bags with sallow-catkins (not too old). Turn into band-box, or well-covered tubs or flower-pots. Many Noctuids and Tortricids will be bred. Collect from as many localities as possible and the result will be much more varied and, hence, far more interesting.

Papilionides.—Pupæ of *Papilio machaon* are to be collected on stems of various plants, dried sticks, &c., in the fens which the species still frequents.

Eggs of *Thecla w-album* on elm, of *T. pruni* on sloe, of *Zephyrus quercus* on oak; all placed as a rule near leaf-buds on twigs.

LATE MARCH AND APRIL.

The condition of the leafage is the best test of what is likely to be an early or late season. When shall I commence to sugar? When is the time to sallow? are questions that the young lepidopterist frequently asks. As soon as the ash-bloom is well out, whether it be in the middle of March or well into April, then is the time for larvæ of *Cirrhoedia xerampelina;* as soon as the sallow-catkins, both sexes, throw out their maturing anthers and pistils, then the moths will come to sallow and, if the evening be mild, to sugar. The same atmospheric conditions that have brought out the sallow-bloom, and

opened the early leaf-buds, will waken up the hybernating larvæ into new life, will cause the over-wintering eggs to hatch, will bring the spring imagines from the pupal stage, and re-awaken the hybernators into activity. *Tephrosia bistortata* and *Eupithecia abbreviata* come to sallows with the newly-emerged Tæniocampids and Pachnobiids, and these are joined by hybernating *Dasycampa rubiginea*, *Hoporina croceago*, *Xylina semibrunnea*, &c., nor must it be forgotten that a long spell of mild weather is not at all necessary to produce rapidly-changed lepidopterological conditions, for the Tæniocampids, and many other early-appearing moths, mature the preceding autumn, and the imagines are already developed in the pupa, a few suitable days being ample to tempt them to emerge. At sallow, a clear sky is always accompanied by a dearth of insects, and it has never yet been explained why, on some apparently suitable nights, sugar will attract more successfully than sallow blossoms, and *vice versâ*. By hedgesides in the daytime one can capture *Dasysoma salicella*, *Choreutis vibrana*, &c.; at dusk on heaths and moors *Larentia multistrigaria* is on the wing; by hedgerows and on the outskirts of woods, *Anticlea derivata*, *A. badiata*, *Cidaria suffumata*, *Aleucis pictaria*, &c., may be dusked for, or searched for later with a lantern, many of them coming freely to flowers of *Berberis*, whilst trunk-hunting now becomes a serious part of one's business, especially in Scotland, where such quarry as *Petasia nubeculosa* is to be expected. Rearing insects, however, is the all-important part of lepidopterological work at this time of the year. Larva-beating by day is much less successful until the buds are expanded and leaves rather fully out, than larva-beating and larva-searching by night, the latter on favourable evenings and in good seasons sometimes giving marvellous results, and one is sure to get a good supply of common Noctuid larvæ, as well as a fair supply of rarer ones, if they are systematically worked for by wood-ridings, hedges, and on the budding birches, hawthorns, sallows, &c., whilst sweeping on heaths is already fairly productive, many good species being now obtainable. Hunting *Brephos parthenias* with a long-handled (twelve feet at least) net gives exhilarating sport on a sunny afternoon, and the muscles of one's leg should be in training, in order to kick vigorously the tall aspens, and shake *Brephos notha* therefrom, when the sun is setting. One wants no hints as to how to catch the early butterflies, except to suggest that a web or two of larvæ of *Melitæa aurinia* may now be obtained, that the earliest sheltered patch of bluebells will be sure to prove an attraction to *Cyaniris argiolus*, and that the hybernating Vanessids are already egg-laying and that large batches of eggs may readily be obtained of many of the species. The sportsman may "semble" for *Dimorpha* (*Endromis*) *versicolora* and *Saturnia pavonia* in the afternoon in suitable localities, whilst, quite at the end of April and on into May, our midland and northern moorlands want working for *Gastropacha ilicifolia*. It may not be out of place here to note that, in rearing insects, a want of knowledge of the natural food-plant or inability to get it, may lead to the loss of a brood of young larvæ, and that knotgrass (*Polygonum aviculare*) will be eaten by almost all species in confinement, particularly Geometrids, whilst sallow, birch, plantain, dock and dandelion are general pabula for a large percentage of the Noctuids.

Eriocraniides.—If the birch bushes are systematically worked in

April many rare species of the sun-loving genus *Eriocrania*, would doubtless be found to have a more general distribution that is at present supposed. They fly gently above the bushes in the sun, and are very easily captured.

Tineides.—In April, the larvæ of *Psychoides verhuella* are to be found on the underside of fronds of ferns in lanes near Alkham; mining among the sori of *Asplenium ruta-muraria* and the hart's tongue fern (Elisha).

The larvæ of *Lampronia praelatella* should be collected in early April from wild strawberry; generally under the leaves.

Young currant-shoots with withering leaves should be collected in April for *Incurvaria capitella*, and youug raspberry-shoots, showing a similar tendency, should be collected for larvæ of *Lampronia rubiella*.

Adelides.—Towards the end of April, the larvæ of *Nemotois schiffermilleriella* feed on the radical leaves of *Ballota nigra*. They live in cases, and drop as soon as the plant is touched, so that the best way is to search the ground around the food-plant for the flat, oblong, figure-of-eight or fiddle-shaped case in which they live.

The imagines of *Adela cuprella* fly round the sallow blossoms in late April and early May. Wimbledon Common is, we believe, still a good locality for this species.

Glyphipterygides.—At the end of March the stems of *Luzula campestris* bearing brown leaves should be pulled up for larvæ of *Glyphipteryx fuscoviridella*.

The larvæ of *Douglasia ocnerostomella* abound in dried stems of *Echium* at St. Margaret's Bay (Elisha), Cuxton, etc.

The larva of *Acrolepia perlepidella* mines the lower leaves of young plants of *Inula conyza* in April and the beginning of May, completely hollowing them out until they have become mere brown bladders mottled with scattered excrement.

Coleophorides.—In April the plants of *Stellaria holostea*, give plenty of almost full-fed larvæ of *Coleophora solitariella* (Machin).

During April, beat heather, cranberry, *Myrica*, &c., into an umbrella by night; beside Geometrid and Noctuid larvæ, you will obtain those of *Coleophora pyrrhulipennella*, *C. juncicolella* and others in abundance. It is best to tumble the beatings into a bag, and carefully overhaul them at home, or the *débris* can be put into a hat-box with close muslin lid, when the Coleophorids will crawl to the top.

During the first week in April sweeping *Calluna vulgaris* on heaths and moors will also give larvæ and cases of *Coleophora juncicolella*.

The time to get the nearly full-fed larvæ of *Coleophora anatipennella* is at the end of April, when the leaves of the sloe are beginning to shoot. They are then most easily seen.

Elachistides.—The larvæ of *Laverna raschkiella* make long irregular yellowish mines in the leaves of *Epilobium angustifolium*. When looking for them I always find myself singing—

> White mines they never hold larvæ,
> But yellow ones always contain them, I see,

and this couplet is quite true (Corbett).

The larva of *Laverna miscella* is to be found mining the leaves of *Helianthemum* towards the end of April.

ARGYRESTHIIDES.—The larva of *Argyresthia aurulentella* mines the leaves of juniper at the end of April; it never enters the stem.

At the end of April, and during May, pick the rolled-up leaves of sallow. *Argyresthia pygmaeella* will be bred.

LYONETIIDES.—The larvæ of *Bucculatrix cristatella* nibble the leaves of yarrow in March and April, causing the bitten edges to turn brown, which betrays their presence. The beautiful ribbed whitish cocoon is spun irregularly across the front of the leaf and may be found in May.

TORTRICIDES.—At the end of April, and during May, pick the rolled-up leaves of sallow for *Hypermoecia angustana*, *Penthina capreana*, *Tortrix crataegana*, *Ptycholoma lecheana*, *Ephippiphora populana*. Quite a number of species will be obtained if the leaves be gathered continuously for several weeks.

At the end of March and on through April, so long as they are available, collect the catkins of birch, and tie up tightly in linen bags for a week or two, then turn them into a band-box with a close-fitting lid; *Paedisca bilunana* and many other species will be bred.

Aspen leaves that are rolled up like cigarettes will yield *Tortrix branderiana*.

The larva of *Tortrix teucriana* is to be found in March and April in rolled-up leaves of *Teucrium scorodonia* in Folkestone Warren.

The imagines of *Amphysa prodromana* fly during the late morning and early afternoon sunshine amongst *Calluna vulgaris* and *Vaccinium myrtillus* in April. Towards 3 p.m. or 4 p.m. they settle on the tops of the twigs, and at this time, too, the ♀ s may frequently be found *in cop.*

In March and April the larva of *Paedisca oppressana* feeds within the buds of *Populus nigra*.

Collect an abundance of sallow catkins, keep them in a large tub or bandbox, and you will breed numbers of *Grapholitha nisana*, &c. (Different localities will give a variety of species.)

The larvæ of *Grapholitha geminana*, *Peronea caledoniana*, and *Penthina sauciana* feed in spring in the tops of bilberry (*Vaccinium myrtillus*) the plants being sometimes quite blighted by the larvæ.

The imago of *Steganoptycha subsequana* should be looked for amongst silver fir or spruce at the end of April. In the daytime it seems most inclined to fly in the early afternoon, when it may be beaten out of the trees, and it also flies naturally at dusk.

The sunny side of spruce hedges should be beaten during the first week of April for *Steganoptycha pygmaeana*; it can only be disturbed from about 12.30 p.m. to 4.30 p.m.; during this period the male flies out if disturbed, but the female drops to the ground.

The larvæ of *Sciaphila sinuana* are to be found in the flowers of hyacinth (*Scilla nutans*) just before the flowers are over. A distorted head with some silk spun among the flowers, or the corolla closed by silk threads, is sure to contain the larva.

The larva of *Retinia pinivorana* occurs in young trees of Scotch

fir (*Pinus sylvestris*) during the last fortnight of April, preferring, however, the side shoots to the central ones.

About the second week in April the central shoots at the tops of branches of young trees of Scotch fir (*Pinus sylvestris*) should be collected for larvæ of *Retinia turionana;* the larva clears out the centre of the shoot. The pupæ may be collected towards the end of the month; a shoot containing a pupa does not commence to grow in the spring, and can thus readily be distinguished.

The larva of *Retinia sylvestrana* feeds in the shoots of stone-pine (*Pinus pinea*) and other pines in March and April. It may be detected by the pellet of frass which is ejected from the tunnel by the larva, and which remains attached outside.

In the months of April and May the larvæ of *Retinia buoliana* are plentiful in the leaf-buds and young shoots of different species of *Pinus*, eating out the entire centre of the shoot. The presence of a larva can be assumed by there being an opaque and hollow resinous exudation on a bud. The boring larva mounts upwards with the shoot and pupates near the top of it.

The larva of *Ephippiphora nigricostana* passes the winter in the stems of *Stachys sylvatica*, which should be collected in March and April.

The larva of *Ephippiphora cirsiana* may be found through the winter in the old flowering stems of *Inula dysenterica* just below the surface of the ground, as well as in those of other plants.

In April the larvæ of *Ephippiphora pflugiana* may be obtained from thistle-stems.

Those who neglected to do so earlier may still collect roots of *Artemisia vulgaris* for larvæ of *Ephippiphora foeneana* and *Dichrorampha simpliciana*.

The swollen roots of *Stachys palustris* should be collected at the end of April for larvæ of *Orthotaenia antiquana*.

Spruce fir cones collected in March and April should be overhauled for larvæ of *Coccyx strobilana*, which feed up and pupate therein; keep in closed box.

The larvæ of *Coccyx hyrciniana* are plentiful on spruce firs about the middle of April.

Stems of wild cabbage, collected in April, showing little heaps of brown frass sticking out of the new shoots and leaf-stalks, contain larvæ of *Stigmonota leplastriana* (common on coast near South Foreland).

In early April you can still collect the dead teasel-heads of the previous year. Keep in a bandbox, and you will breed *Penthina gentiana*.

The larvæ of *Dichrorampha plumbana* and *D. plumbagana* are to be obtained in March and April by digging up plants of *Chrysanthemum leucanthemum*. The latter tunnels in the centre of the root-stocks, whilst the former occurs deeper down in the roots, grooving them deeply under cover of a web. The larva of *D. plumbana* also mines in stems of *Achillea millefolium*, as also does that of *D. politana*.

By the end of April the twisted ox-eye daisies should be collected for *Dichrorampha acuminatana* and *D. consortana*.

Roots of *Centaurea nigra* collected in April will produce *Xanthosetia zoegana* in July.

The larva of *Chrosis rutilana* feeds in a slight web on the shoots of juniper in April and May.

By collecting teasel-heads in April and May, and putting them in a bandbox, *Eupoecilia roscana* will probably be bred in plenty.

Pyraloides.—The larvæ of *Depressaria assimilella* are to be found feeding between united broom-twigs in early April.

At the end of April, and during May, pick the rolled-up leaves of sallow. *Tachyptilia populella* will be bred.

During April and May the larvæ of *Lita viscariella* are to be found in the tops of *Lychnis*.

The larva of *Lita instabilella* makes a greenish-white mine in the fleshy leaves of *Atriplex portulacoides* and is full-fed about the middle of April. It leaves its mine to pupate.

The larva of *Lita plantaginella* burrows in the root of *Plantago coronopus* and changes therein to a pupa. Its presence is indicated by a small heap of pale brown frass on the crown of the plant, sometimes partly hidden by the leaves; full-fed at end of April or early in May.

The shoots of *Anthyllis* should be examined in April; their bleached appearance betokens the presence of *Anacampsis anthyllidella*.

Seedheads of *Arctium lappa* should be collected in April for pupæ of *Parasia lappella*: the larvæ pupate in the heads and the imagines emerge in July.

Amphisbatis incongruella is much overlooked in the south of England owing to its early appearance, we have repeatedly taken it in great abundance in late April and early May on the chalk-hills of Kent.

Larvæ of *Œcophora unitella* (*fuscoaurella*) have been found in April, under the decaying bark of elm.

The larvæ of *Hypercallia citrinalis* (*christiernana*) were found on *Polygala vulgaris* between April 27th and May 22nd, 1868, near Shoreham (Walsingham).

Pyralides.—The roots of sorrel collected at Folkestone in April give larvæ of *Scoparia* var. *ingratella*.

Crambides.—Search the sand about the roots of various grasses and sedges on the sandhills near the seaside for the silken tubes in which the larvæ of *Anerastia lotella* reside.

The larva of *Rhodophaea advenella* spins together the hawthorn buds in April or May, or if there be no buds it spins up the young leaves; it is of a bright green colour with red subdorsal lines. The larva can be beaten but is best obtained by searching.

At the end of April and beginning of May the larva of *Dioryctria* (*Nephopteryx*) *abietella* sometimes feeds in a central shoot of Scotch fir. It is, however, more often found in dead shoots of the previous year's growth, eating out the pith. The stem or shoot which contains a larva may be known by its decayed or sickly appearance, the needles being shrivelled and brown.

Brephides.—In late March and April *Brephos parthenias* sometimes flies in great abundance among birches, more especially in the afternoon sunshine; the species appears to fly lower about 4 p.m. than in the earlier part of the day, and is then more easily captured; in

morning and early afternoon the moths fly higher and want a long net for their capture.

In open parts of woods, high up around the tops of young aspens, the imagines of *Brephos notha* are sometimes to be seen in March and April, on hot sunny days, flying in considerable numbers. Towards evening kick sharply the stem of the trees and look carefully at everything that falls; the imagines are thus frequently dislodged, often when *in copulâ*.

The full-fed larvæ of *Brephos parthenias* and *B. notha* must have a piece of old cork in which to pupate.

Cymatophorides.—In the first week of April search birches for *Asphalia flavicornis;* they are generally found on the stems and branches, but often resting on pieces of twigs on the ground.

The imagines of *Cymatophora ridens* are best found about April 15th upon the trunks of oak, generally from one to four feet up the tree; they are difficult to see, being of the same colour as the bark (Mawson).

Geometrides.—Trunk-hunting is one of the more successful modes of work this month—*Phigalia pedaria, Nyssia hispidaria, Biston hirtaria, Amphidasys strataria, Tephrosia bistortata, Eupithecia abbreviata*, &c., may be thus captured.

One finds the species that simulate dead leaves hanging on bushes—*Selenia bilunaria, S. lunaria, S. tetralunaria, Odontopera bidentata*, &c. These are much less rarely taken on the trunks.

Scotch fir will still yield larvæ of *Thera variata, Ellopia prosapiaria* (*fasciaria*) and, in some localities, *Boarmia abietaria;* from stunted alders and birches may be beaten larvæ of *Geometra papilionaria:* oaks will yield larvæ of *Boarmia roboraria* and *Phorodesma pustulata.*

To rear larvæ use wide-mouthed glass bottles (such as those in which the anchovies of the Compagnie de la Mediterranée are sold) about six and a half inches high, and three and a quarter inches in diameter; at the bottom place baked sand, damp enough for larvæ but not so as to cause mould, on this baked moss; plant food in the damp sand; lids should be constructed of wire rings (ordinary fencing wire) covered with muslin, &c., and made so as to fit easily over the mouth of the jar (Wilson).

In April the males of *Nyssia zonaria* are found sitting on the bare twigs of dwarf sallow or on grass tufts on the Wallasey sand-hills.

The females of *Nyssia zonaria* often outnumber the males on the Wallasey sand-hills, and occur in some years literally in hundreds; the males are often very conspicuous resting flat on the short herbage, others low down on the stems of the coarse grass. April 20th-30th, are fair dates, much, however, depends on the seasou.

In early April the limes which grow so freely in London streets and gardens should be searched for *Biston hirtaria*, which rest usually on the main stem, frequently within reach, and are not difficult to spot. They stick close to the trees, and are found almost everywhere in London, and are equally abundant in the afternoon as in the morning.

About March 16th is the date for *Nyssia hispidaria* in Richmond Park. In some parts of the park in some seasons they are abundant, whilst in other parts not a specimen is to be seen.

Where *Boarmia repandata* var. *conversaria* occurs the larvæ should be searched for at night about the end of April along the side of woods and hedges; the pale larva is then easily found, and may be beaten into an umbrella, but it is of little use searching for it in the daytime; almost polyphagous in confinement, but found wild most commonly on hawthorn, blackthorn and birch in the order named (Fenn).

In gardens the end of April will give *Hemerophila abruptaria* on palings, fences, &c., near lilac and privet bushes; emergence is spread over three or four weeks.

The first warm days at the end of March and early April bring out imagines of *Tephrosia bistortata*, which should be searched for in woods on tree-trunks; it is best obtained at the bottom of the larch-trunks, &c., when drying its wings. *T. crepuscularia* does not usually appear until May and early June, when it occupies somewhat similar situations.

Near Perth, *Tephrosia bistortata* is abundant in the larch woods during April, whilst *Cidaria suffumata* and the ab. *piceata* are almost everywhere at the same time (Wylie).

Search the trunks of trees in woods towards the end of April for *Tephrosia consonaria* (Moberly).

The trunks of oaks should be searched during the afternoon in March and April for newly-emerged imagines of *Amphidasys strataria*.

Towards the end of March and throughout April the almost full-fed larvæ of *Gnophos obscurata* are to be found feeding by night on *Geranium lucidum*, preferably on the flowers, but the larvæ are also to be obtained in January and February.

During April the small larvæ of *Pericallia syringaria* are to be found hanging at night from their food-plant (honeysuckle).

The larvæ of *Ellopia prosapiaria* must be beaten at the end of March and early April with those of *Thera variata* and *T. firmata* from pines (the former species does not pass the winter as a pupa as Newman says). The larvæ of *Thera variata* will pupate towards the end of the month; those of *Ellopia prosapiaria* obtained with them will pupate during the first fortnight in May.

The larva of *Scodiona belgiaria* is to be obtained by sweeping heath in April; the imagines rest on the ground in June. Common on the Greetland Moors (Porritt).

By dusking along mixed hedges containing blackthorn, in April, a few *Aleucis pictaria* may be captured, but by searching low blackthorn hedges about an hour after dusk large numbers may be obtained (Raynor).

The imagines of *Aleucis pictaria* appear to prefer sitting on twigs or flowers of sloe-bushes at night after flight, whilst in the larval stage the stunted bushes growing in its special localities are those most affected.

Anisopteryx aescularia is sometimes to be found in numbers by searching tree-trunks in the late afternoon. It is often also abundant on the framework of roadside lamps in the early morning.

Larentia multistrigaria usually rests at the foot of palings, &c., in its haunts, where it is almost hidden by the herbage.

Hybernated larvæ of *Phorodesma smaragdaria*, very much like a little bunch of withered leaves, may be obtained by searching *Artemisia maritima* in April and May.

The larva of *Geometra papilionaria* must be searched for on birch-trees in April; it sticks out from a twig and exactly resembles a birch catkin at this time of the year, so that all suspicious-looking catkins should be carefully examined.

The ova of *Lobophora viretata* are to be found during the last week of April on the terminal shoots of holly, particularly those at the tops of the trees bearing flowers; the larvæ hatch in from 7-12 days, feed first on the flowers, next on the green berries, and, lastly, on the young leaves; in confinement they take readily to privet, and eat bark as well as leaves. To beat the larvæ, spread a sheet on the ground and use a ladder (Tunaley).

During the latter part of April *Lobophora carpinata* can generally be found on the trunks of trees among its food-plants.

Collect plenty of sallow catkins in March and April and keep in bandboxes if you wish to breed *Eupithecia tenuiata*.

The larvæ of *Eupithecia rectangulata* feed in flowers of apple (crab and cultivated) in April and May, the blossoms being spun together by a silken web; the pupæ are to be found under loose bark and moss on the trunks in May and Jnne.

Fences, palings, &c., near clematis bushes, should be searched for examples of the early brood of *Eupithecia coronata*.

Eupithecia dodoneata, usually said to be attached to oak, is much more frequently met with among hawthorn, being disturbed during the day; it is said to fly naturally in early morning sunshine as well as at dusk.

Search the trunks of apple-trees during April for *Eupithecia consignata*.

The first brood of the local *Mesotype virgata* (*lineolata*) is often well out on the coast sandhills (Deal, Wallasey), &c., during April and early May; the second and third broods are usually still more abundant in June and August.

Much depends upon the season, but usually late April will give *Bapta taminata* (cherry and sloe), *B. temerata* (sloe), *Zonosoma pendularia* (birch), *Numeria pulveraria* (sallow), *Eupithecia pumilata* (furze), *E. vulgata* (hawthorn), *E. irriguata* (birch), *E. abbreviata* (oak), &c.

Pterophorides.—In April and May young leaves of burdock (*Arctium lappa*) will often show the little round holes made by the feeding larvæ of *Aciptilia galactodactyla*, which hide on the underside of the leaves and are well protected by their pale greenish-white colour; the old leaves show most conspicuous traces of the feeding, but the greater number of larvæ will be found on the young and as yet not fully expanded leaves.

In late April collect the flowerheads of coltsfoot (*Tussilago farfara*), tie up in linen bags at first, and then turn out in a few days into a bandbox; you will breed *Platyptilia gonodactyla*.

The larva of *Mimaeseoptilus* var. *plagiodactylus* eats down into the heart of *Scabiosa columbaria* in April and May, before the flowering stem is thrown up.

The larvæ of *Aydistis bennettii* feed on the leaves of sea-lavender (*Statice limonium*) in April and May (and again in July). The large pieces taken out of the leaves are a good guide as to the whereabouts of the larvæ.

Sesiides.—The sickly-looking plants of dock and sorrel found along the slopes of Folkestone Warren, on the sea-face of the cliffs, give larvæ of *Sesia chrysidiformis* in early April. The presence of a larva may be readily discovered by the mines and frass in the root-stocks. Plant again the roots dug up which do not produce the desired larvæ, as such disturbed roots are always productive the next year. Plant the affected roots in a fern case; water well, and keep in sun.

Sesia tipuliformis larvæ can still be obtained, feeding in the stems of old currant-bushes, or in the pruned branches of younger ones; the branches generally contain larvæ the year following that in which they are pruned, the females in June laying their eggs in the branches pruned a few months before.

Sesia myopiformis larvæ are now full-fed in stems of apple and plum, usually in pruned or old trees; the sawing off of branches containing the larvæ appears to be the only means of making sure of the imagines; sleeving an affected branch is sometimes successful.

The larva of *Sesia cynipiformis* is to be found in April (and May) between the bark and solid wood of oak-stumps, and spins a small cocoon before pupating, which may be found by pulling off the bark.

The pupæ of *Sesia formiciformis* should be obtained by cutting off the tops of osier stumps during April and May.

The larvæ of *Sesia culiciformis* are to be found in two-year-old birch stumps, *e.g.*, those cut down in the winter of 1900-'01 will be found to contain larvæ in April, 1902. They feed just under the bark, in the wood, but the large quantities of frass thrown out between the wood and bark leave no room for doubt where this species is to be found.

Sesia sphegiformis lives in young suckers of alder, where the old tree has been cut down; the larva eats a gallery up the centre of the shoot for nine or ten inches, then turns aside, eats through the bark, and assumes the pupal stage within the burrow (Merrin); to find whether an alder contains a larva bend over the branches carefully to see whether the bark cracks, then gently raise the bark. If there be a round hole it is almost sure to contain a *Sesia* larva or pupa; the branch must then be cut low down, and the sticks kept in damp sand. The month of April is the best time to look for larvæ.

In March and April look over the willow sticks that have been cut in woods (or elsewhere) during the previous winter. In them a number of orifices will often be observed; the burrows contain the full-fed larvæ of *Trochilium bembeciforme*. [In Hereford the sallow stems cut in winter for hop-poles are often seen to be tunnelled by these larvæ, often two or three in a single pole (Hodges).]

Psychides.—The larvæ of *Diplodoma herminata* (*marginepunctella*) commence, in late April, to crawl up on fences, tree-trunks, &c., for the purpose of pupation. The large case makes this species quite unmistakable.

About the last week in March, the larvæ, pupæ and imagines of *Solenobia inconspicuella* occur abundantly on palings and old elm trunks on Clapham Common (Coverdale) and elsewhere.

The larvæ of *Taleporia tubulosa* (*pseudobombycella*) begin to leave the hedgesides, &c., where they feed, and climb fences, walls, tree-trunks, &c., for pupation, in late April. The long, slender, cylindrical case is characteristic.

The cone-shaped cases of *Luffia lapidella* are actively on the move, on lichen-covered walls towards the end of April, the larvæ being now nearly full-fed; the conical *Luffia* cases are immediately distinguishable from the triangular-sectioned cases of *Solenobia*.

The cases of *Acanthopsyche opacella*, should be sought for in late April and May, as the larvæ leave the ground and seek some higher position for pupation.

To obtain the cases of *Pachythelia villosella*, I search, during the months of March and April, the trunks of fir-trees. The cases are generally to be found from one to two feet from the ground. This appears to be the favourite position taken up for pupation. They are also to be obtained on the ends of twigs of *Ulex europaea* (Fowler).

The cases of *Sterrhopterix hirsutella*, formerly common in the woods around London and other localities, but now rarely found, should be searched for on tree-trunks, the larvæ being almost full-fed towards the end of April and through May.

Lachneides.—Beating sallows will yield young larvæ of *Trichiura crataegi* and *Poecilocampa populi:* the larvæ of both species may also be beaten from many other trees.

The cage in which the larvæ of *Trichiura crataegi* are kept should be placed where the morning sun can shine on it, as they love to bask in the sunshine.

Dimorphides (Endromides).—*Dimorpha* (*Endromis*) *versicolora* is a very uncertain species in its appearance, in some years being quite abundant in its favourite haunts; the males fly swiftly in the morning sun, the females hanging from bare twigs or resting on the heather in April.

The females of *Dimorpha versicolora* are rarely to be found in any abundance until the males have been well out for a week or more (Andrews).

The eggs of *Dimorpha versicolora* are laid in little batches on the twigs of birch and alder; soon resemble closely the colour of the bark on which laid.

Saturniides.—The last week in April and the earlier part of May is the time to assemble *Saturnia pavonia*.

Nolides.—Search the trunks of trees in woods towards the end of April and in early May for *Nola cristulalis;* it often sits head downwards on the stems of privet, beech, hornbeam, birch and oak; rather conspicuous on beech and hornbeam.

Nycteolides (Chloephorides).—At the end of April beating oaks will give larvæ of *Hylophila bicolorana* (*quercana*).

Notodontides.—In March and April the alder trunks should be carefully scanned for the cocoons of *Cerura bicuspis*. The earliest imagines appear towards the end of April on birch and alder trunks.

From April 10th-21st is the best time to search for *Lophopteryx carmelita*. It is generally found upon the trunk of a birch or oak about mid-day, about four or five feet up the stem (Mawson), the last week in April in the Reading district on birch trunks for imagines (Holland), or on palings near; flies in sunshine; may be taken at sallows, and is attracted by puddles (Merrin).

Petasia nubeculosa is to be sought during April on birch trunks in the Rannoch district.

Lymantriides.—The larvæ of *Dasychira fascelina* are to be obtained on dwarf sallows on the coast sandhills of Lancashire, on the northern moorlands (and elsewhere), in April and early May.

Noctuides.—Sugar should always be applied to the trees before sunset, and, when practicable, it should be put on warm, as the scent is much more powerful than when it is applied cold. The greatest number of moths will generally be found about three-quarters of an hour after sunset. Many species visit the sugar in the morning about an hour before sunrise (Doubleday).

I find that, as a rule, evenings following fine or showery days with a west or south wind, and some sort of moisture on the grass, either rain or dew, and no, or at least a very young, moon, are good for moths if the wind is not too strong, whereas a dry night, or when the wind is north or east, is usually bad (Keyworth).

Searching for larvæ by night in April and May is sometimes exceedingly profitable. Large numbers of larvæ of *Triphaena ianthina*, *T. fimbria*, *Xylophasia scolopacina*, *Noctua baia*, *N. brunnea*, *N. triangulum*, *N. ditrapezium*, *Aplecta nebulosa* may still be captured on hawthorn, sloe, or the low plants that carpet our woods in the neighbourhood of London. Many woods in which the Rhopalocera and day-flying Geometrids have become practically exterminated, still produce many Noctuids in abundance.

Sallowing will be in full force at the end of March and early April (for details see *Ent. Rec.*, vol. vii., pp. 241-243).

Plum blossom should be worked (as well as sallows) for the early emerging moths at dusk in April.

Larvæ of *Leucania littoralis* are to be obtained in April on the coast sand-hills by raking the sand at the roots of marram grass (*Ammophila arundinacea*). I have generally obtained the larvæ of *Leucania lithargyria* by cutting open old stems of thistles and umbelliferous plants to which they resort for concealment during the day (Eales).

The larva of *Nonagria neurica* lives in stems of common reed; a small hole is visible in the stem if tenanted by a larva (Merrin).

Sweeping or searching low herbage by night in favourable places still gives good results in Noctuid larvæ—*Aporophyla australis* (usually at seaside, Deal, Brighton, Portland, &c.), many Leucaniids, Agrotids, Noctuas (*sens. strict.*), &c.

Xylomiges conspicillaris imagines should now be sought at rest on trees, may also be beaten, and have been taken at sugar (Merrin).

During the last fortnight of April search the beds of striped grass in gardens for the larvæ of *Apamea ophiogramma*, which feed low in the stems, select the drooping or faded leaves; gently pull the infested

shoot from the bottom and avoid pressure as much as possible, and in the stem a larva will be found.

The larvæ of *Apamea unanimis* are to be found among grass in April when pupa-digging at the roots of willow, and later the pupæ may be found spun up under the loose bark of willow. The moths emerge in late May and June (Machin). These larvæ hybernate and then spin their cocoons in late March and April; the latter may be found not only under decayed bark on willows, but in stems of thistles, burdock, teasel, or, in fact, anything that affords sufficient concealment.

At the end of April (20th-30th) the nearly full-fed larvæ of *Agrotis* var. *ashworthii* may be found basking in the sun; they also feed freely and crawl about the rock-cistus in the daytime, as well as at night. In captivity they will feed on hawthorn, primrose, dandelion (flowers) and sallow-catkins. Penmaenmawr is one of the best known localities.

Throughout April is the time to sweep *Erica cinerea* for larvæ of *Agrotis agathina*. This should be done by night or in the early morning. The larvæ should be fed on *Erica cinerea* or *E. tetralix*.

On April 27th I swept 27 larvæ of *Agrotis agathina*, and a few days afterwards hundreds more (Norman).

To rear *Agrotis agathina* take a section of a 40-gallon paraffin cask, out of which the oil has been thoroughly burned, place it over a plant of *Erica* plunging it into the ground to a depth of six or eight inches, the topmost shoots of the plant should be about level with the top rim of the section. Then cover the whole with muslin. I use a light framework of cane to raise the muslin well over the tub and plants (Ash).

The larvæ of *Noctua sobrina* may be swept at night in April and May from *Vaccinium* on our moors.

Imagines of *Pachnobia leucographa* taken at sallow, placed in a large glass jar with a supply of plantain leaves, &c., will lay their eggs thereon; feed with moistened sugar.

Pachnobia leucographa and *P. rubricosa* will lay freely on small bunches of thread-ends, if suspended or coiled up in a box or cover in which ♀s are kept; any bits of torn muslin or stray thread-ends will suffice, but the moths refuse a smooth surface.

Eggs of *Taeniocampa opima* may readily be found on the Cheshire sand-hills on the old dead stems of hound's-tongue and other plants, and being deposited in large clusters are conspicuous at a considerable distance (Porritt).

During April the small bushes in a recently cut wood should be searched by night for larvæ of *Aplecta tincta*, *Triphaena fimbria*, &c.

The larvæ of *Aplecta tincta* are best obtained by searching birch bushes in April by night with a lantern.

Larvæ of *Bryophila glandifera* and *B. perla* construct little cocoons in which they hide by day, made of silk with pieces of lichen, stone, mortar, &c., worked in, the whole having an appearance like that of the wall itself, but the slightly swollen surface betrays the presence of the cocoon; the larvæ feed at night and early morning, and may be frequently found outside when the weather is wet and mild.

Eggs should also be obtained this month from *Xylina socia* (*petrificata*) and *X. semibrunnea*. Pieces of oak, birch, ash, &c., should be given on which to lay.

The larvæ of *Cirrhoedia xerampelina* may be found at dusk with a

lantern, crawling up ash-trunks or feeding on the ash-blossoms; they are concealed by day under moss on the trunk, in chinks of bark, or among grass at the base of the tree; very retired and sluggish in habits; feed sparingly on ash-shoots and hawthorn (Merrin).

Towards the end of March beat the bare twigs of ash, either trees or hedgerow bushes, after dark, for larvæ of *Cirrhoedia xerampelina*. Feed up on the large unopened buds, until the trees break into leaf. By this means some 40 or 50 larvæ were obtained in the spring of 1897, in Suffolk, and a nice series of imagines was bred therefrom (James).

The larvæ of *Cirrhoedia xerampelina* are best obtained during April and May, when climbing up the trunk of ash-trees just at dusk. This is not only a less cumbersome method than beating, but a much more successful one, and three dozen is not at all an unusual number for a favourable evening's search; they appear to be most plentiful when the trees are in full bloom, and prefer the flowers to the buds for food. The larvæ that were collected gave 400 imagines and not a single ichneumon (Porter).

The end of March and first week in April—both at sugar and sallow—form the best period for hybernated *Dasycampa rubiginea*; they lay fairly freely, and the larvæ are not difficult to rear, feeding on apple, plum, &c. (Mason).

Dasycampa rubiginea eggs are laid singly from the middle of April; the larvæ feed freely on apple, either in breeding-cage or sleeved; feed also on dandelion, but leave latter for apple. ♀s taken after hybernation and kept for egg-laying should be fed on honey mixed with a few drops of sherry. Place all those captured in a bandbox with muslin cover, place twigs of apple scored with a knife, as the ♀ likes a niche in which to deposit her eggs (Robertson).

As soon as the sallows are in bloom every warm evening should be spent working those trees that are in sheltered spots. Living females of *Hoporina croceago* should be placed in large glass jars, fed with moistened sugar, and given a few oak-twigs with old leaves attached, when eggs will be freely laid.

The eggs of *Tiliacea citrago* should be kept in a cool place all the winter, otherwise they will hatch before the leaf-buds of the lime are ready for them.

When sallows are in full bloom fill a bag with catkins from as many different localities as possible, place those from each district in a separate bandbox (or, preferably, a lard tub with a sheet of glass over it) and you will breed a great variety of really interesting insects—*Citria fulvago* (*cerago*), *C. flavago*, *Cleoceris viminalis*, &c.

The larvæ of *Citria flavago*, *C. fulvago*, &c., obtained from sallow-catkins, should be supplied with sallow leaves as they grow larger, as they feed on these and a variety of low-growing plants.

At the end of April, and during May, pick the rolled-up leaves of sallow. *Epunda viminalis*, *Orthosia lota*, &c., will be bred.

Arctiides.—Those who wish to pair *Spilosoma mendica* must, as in the case with many other species, put them in a cage through which a current of air blows. Perrin's balloon fly-traps are admirably adapted for the purpose.

Papilionides.—Watch a ♀ *Gonepteryx rhamni* at work egg-laying

on the leaves and petioles of *Rhamnus frangula;* collect the leaves and shoots afterwards, and you will readily find the spindle-shaped eggs, the larvæ from which are easily reared.

The young larvæ of *Apatura iris* may be beaten from sallows; the lowest and most unpromising-looking bushes are often productive of these larvæ (for details see *Ent. Rec.*, vi., pp. 146-147).

Larvæ of Argynnids—*paphia*, *adippe*, *aglaia*, *euphrosyne*, and *selene*—should now be sought on various species of *Viola;* they feed in the daytime but are usually well hidden.

The larvæ of *Melitaea cinxia* are to be obtained in their restricted haunts in the Isle of Wight towards the end of April; gregarious, and hence the capture of one usually means the capture of a brood.

Hedgesides, and the ridings of woods will give larvæ of *Pararge egeria*, *Pararge megaera*, *Enodia hyperanthus*, *Epinephele tithonus*, &c., in their respective localities; these are best obtained by sweeping or searching with a lantern by night. Larvæ of *Arge galathea*, *Hipparchia semele*, &c., can similarly be obtained in their known haunts.

The larvæ of *Erebia aethiops* may be collected in abundance at night with a lantern in its local haunts.

MAY.

May, from which can hardly be dissociated early June, forms a very busy period of the year for the lepidopterist. The woods, fields, and hedges are clothed in their new verdure, and possibly one-third of the lepidopterous fauna must be collected during this period, if the species are to be obtained at all, the larval and imaginal stages being those in which the majority of species are now in existence. Larva-beating and larva-searching is at its height and large numbers of rare and local species are to be obtained; at night, a good sweep-net for heather and rough herbage is invaluable, and it becomes necessary to consider the different habits of the various larvæ one is rearing so that the best results may be obtained in breeding them. Sleeving is undoubtedly one of the most successful methods for tree- and shrub-feeding larvæ, but the creatures themselves are less distinctly under observation, and scientific results are less readily obtained. Above all things, fresh food, fresh air, and plenty of space are absolute necessities. Various modes of day-work are in vogue, watching flowers for the "beehawks," beating for Geometrids, working with a long net around trees, or with a shorter around bushes, in the afternoon sunshine for Tortricids, trunk-hunting for Notodonts, Tineids and Geometrids, disturbing rough herbage for *Euthemonia russula*, &c., netting at sunset for *Nemeophila plantaginis*, &c., 'sembling for *Macrothylacia rubi*, &c., dusking for Geometrids and Hepialids, sugaring for Noctuids, and so on. The temptation to attempt more than one can deal with scientifically is very great, and one may here urge that a daily diary should be kept—as detailed as possible—that larvæ and pupæ should be dropped into spirit and labelled for future use, and that none of the little things that make collecting useful scientifically should be forgotten. Details as to killing, setting, &c., would be out of place here, but details as to sugaring are always worthy of remembrance. Never forget that moths have varying tastes and habits and exhibit

them. The most attractive black treacle, mixed with the most alluring jargonelle, rum or methylated spirit, is useless if the weather be wrong, and may be equally useless if the weather be right unless the worker attends to detail, and remembers that some affect the drips, others drink and walk round to the other side of the tree, and so on; and that whilst some species come early, others come late and may be entirely missed by the worker in a hurry. Flowers, too, are very attractive during this season—Dianthœcias, Cucullias, Sphingids, and representatives of many other groups, coming in abundance on suitable evenings, as soon as dusk has really taken possession. By the end of the month almost one-third of the British species of Geometrids and Noctuids are on the wing, but much must be allowed for the season, and late seasons may be quite two (or three) weeks behind a normal one, whilst the comparison of such years as 1888 (late) and 1893 (early), gives a difference of from six to seven weeks for the appearance of the same species—the middle of April produced abundantly, in 1893, the same species that occurred rarely in the middle of June 1888, and which should occur normally in the middle of May. But Tortricids and Tineids are, perhaps, out in the greatest proportions, whilst, among the Pterophorids, only the double-brooded *Leioptilus microdactylus*, *Hellinsia carphodactyla*, and *Mimaeseoptilus bipunctidactylus* are as yet on the wing, almost all the remaining British species being obtainable still in the larval stage. Pupæ of the still-increasing number of species that emerge in June are also available; rolled-up leaves in profusion occur everywhere, containing pupæ or larvæ of Tortricids (and Tineina), and the larvæ of a small proportion of the Tineina alone would fully occupy all one's time and attention, and this, much more satisfactorily, than the promiscuous collection of imagines, here there and everywhere, whilst the work among ova, larvæ, and pupæ still waiting to be done scientifically is enormous. It would well repay an entomologist, in spite of the temptation, to lay down his net for two or three years and devote his time to hunting the lepidoptera in their early stages; at the end of that time his observations and descriptions, properly digested and carefully prepared, would ensure his name being handed down to future generations of scientific workers, whilst his collection would be enriched with species quite unknown to the mass of collectors without souls. At any rate, May and early June comprise one of the best periods of the whole year for work among the early stages, and the collection of imagines should be quite subsidiary to that of working for larvæ, pupæ, and the clearing up of difficulties relating to life-histories. Canvas and linen bags of various sizes are much more satisfactory for carrying larvæ than larval tins, whilst closed tins should be eschewed altogether. The latter part of May (and early part of June) produce a large percentage of the species in some families in the imaginal stage—about one half of the genus *Eupithecia*, almost all the Notodonts, Acronyctids, a very large percentage of the Tortricids, Gelechiids, Gracilariids, Elachistids, Lithocolletids, and almost all the genus *Nepticula*—whilst at the same time almost all the Coleophorids, Pterophorids, Depressariids, &c., are in the larval stage.

Micropterygides.—From mid-May into early June search the buttercup flowers in damp places for *Micropteryx calthella*: the imagines are sometimes seen six or seven in a single flower feeding on the pollen.

Tineides.—The small cases of *Meessia richardsoni* (*vinculella*), resembling in shape unusually well-made cases of *Tinea pellionella*, may be found up to the end of May, on the undersides of stones, feeding on a microscopic lichen, but are hard to see, as they are so like their food in colour. This species occurs in Portland and Purbeck, and will not improbably be found elsewhere on limestone rocks on the coast, if carefully looked for. The imago is hardly ever seen at large.

Plutellides.—The larvæ of *Eidophasia messingiella* spin a few strands of silk across the young shoots of *Cardamine amara*, drawing them together. They should be collected in the middle of May.

The green spindle-shaped larva of *Plutella annulatella* lives amongst the flowers or buds of *Cochlearia*, spinning them slightly together. It is very inconspicuous but very lively when touched.

The semitransparent larva of *Plutella porrectella* feeds upon the flower-shoots and leaves of *Hesperis matronalis* in May and June, and when full-fed spins a white silken cocoon under the leaves.

Coleophorides.—*Coleophora* cases should be collected now. Each species should be kept in different little glass jars, and the cases mounted with the imago for reference—*Coleophora troglodytella* makes blotches on fleabane and *Eupatorium*; *C. palliatella* on oak; *C. ibipennella* on birch; *C. genistaecolella* on *Genista anglica*; *C. vibicella* on *G. tinctoria*; *C. laricella* on larch; *C. saturatella* on broom; several species on elm, rose, sallow, &c. Those on heath must be swept.

The larva of *Coleophora chalcogrammella* was discovered in the larval state by Mr. T. Wilkinson, near Scarborough, feeding on the leaves of *Cerastium arvense* in May.

Cases of *Coleophora badiipennella* should be collected from elms and those of *Coleophora viminetella* from osier in late May and early June.

Old seed heads of *Juncus maritimus* should be gathered in May for cases of *Coleophora obtusella*.

The cases of *Coleophora therinella* are to be found in May on growing *Cnicus arvensis*; the larvæ hybernate on the plant full-fed, pupate in May, and the imagines emerge in June and July.

In May search or beat *Genista anglica* for larvæ of *Coleophora genistaecolella*.

In the middle of May cases of *Coleophora conspicuella* and *C. alcyonipennella* should be collected from *Centaurea nigra*.

Argyresthiides.—In early May the terminal shoots of juniper-bushes should be searched for the feeding larvæ of *Argyresthia dilectella*.

Elachistides.—The full-fed larvæ of *Laverna raschkiella* are to be found in May (and again in July) mining the leaves of *Epilobium angustifolium*.

The larva of *Laverna ochraceella* mines longitudinally in stems of *Epilobium hirsutum*. About May it leaves the main stem, and mines up a leafstalk into a leaf, where it makes a long and rather tough cocoon in its mine, which may easily be found by examination.

In May the full-fed larva of *Batrachedra pinicolella* occupies a gallery on the surface of a twig of spruce (*Abies excelsa*). When full-fed it spins a slender, somewhat flattened cocoon, on the underside of the same or an adjoining twig.

During May watch carefully the flowers of stitchwort (*Stellaria holostea*). In the morning, when sunny, the flowers are frequented in our southern woods by large numbers of *Asychna modestella*.

In May, the larvæ of *Chauliodus insecurellus* feed on the leaves of *Thesium humifusum* (those of the second-brood feed on the leaves, flowers and unripe seeds in July).

In May and June marshy places producing *Angelica sylvestris* and *Aegopodium podagraria* should be visited for larvæ of *Chauliodus illigerellus*, which live in crumpled leaves. (In August the larvæ of the second brood eat round holes through the sheaths of the unexpanded umbels, and feed on the immature flowers within.)

Lyonetiides.—In early May the mines of *Bucculatrix maritima* should be collected in leaves of sea-aster.

Nepticulides.—The mines of *Nepticula weaveri* and *Lithocolletis vacciniella* are worth working for in May on the moorlands; the former require a lot of finding, although the larva mines the uppersides of the leaves of *Vaccinium*, whilst that of the latter mines the underside.

Tortricides.—By beating whitethorn hedges into an umbrella in early May, the pupæ of *Spilonota suffusana*, *Sideria achatana*, *Sciaphila nubilana* and other Tortricids may be obtained in abundance.

The larvæ of *Penthina corticana* feed on birch and sallow, in May and the early part of June.

The larvæ of *Penthina ochroleucana* feed on rose-trees, cultivated as well as wild, in May.

Bright green larvæ collected in May, feeding in the shoots of *Salix caprea*, and drawing the leaves together with a slight web, will most likely produce *Penthina capreana*. The shoots should be kept in a flower-pot in a cool place if you wish to rear imagines.

The larvæ of *Paedisca occultana* may be found feeding on young larch shoots in May, and the imagines may be obtained flying at dusk around the tops of small larch trees in early July. The larvæ form silken galleries along the shoots; they also feed on Scotch fir.

The conspicuously-twisted heads of bramble collected in May produce *Aspis udmanniana*.

The larvæ of *Dicula semifasciana* feed in united shoots of sallow in May and June, generally preferring the dwarf and stunted bushes, and the imagines appear in July.

Retinia posticana is reported to fly in May by day round the tops of Scotch firs in Rannoch; probably it has a much wider distribution.

In May and June the young shoots of stone-pine (*Pinus pinea*) should be collected for pupæ of *Retinia sylvestrana*.

At the commencement of May the side-shoots of branches of Scotch fir-trees should be searched for the light-brown pupæ of *Retinia pinivorana*.

In May collect the young shoots of Scotch fir, which are tenanted by larvæ and pupæ of *Retinia buoliana*.

At the end of May, working among the birches and heather on heaths and commons gives an abundance of *Phloeodes tetraquetrana* and *Phoxopteryx uncana*.

In late May and early June, *Grapholitha lactana* flies among and

over aspens, *Lobesia servillana* among sallows, *Capua ochraceana* among chestnut and hornbeam.

In May some curved structures, not unlike the cases of some Coleophorids, may be seen adhering to the twigs of various species of poplar and aspen. These consist of the material thrown out by the larvæ of *Spilonota aceriana*, which are feeding within the stem.

Towards the end of May and in early June the imagines of *Phoxopteryx upupana* fly high above birches and oak in the sunshine; it wants a long-handled net to capture them readily.

The larva of *Phoxopteryx siculana* is to be found on *Rhamnus frangula* in May; the imago flies at dusk, in late June and August, over the herbage where its food-plant grows.

In May the imagines of *Coccyx splendidulana* dance round the extremities of the branches of oak-trees in the morning and afternoon sun, often in large numbers.

Stigmonota nitidana flies high up around the projecting twigs of oak-trees in late May and June. Stand beneath the outer branches of an oak, and with a long net large numbers may be taken in the afternoon and until sundown.

The imagines of *Stigmonota weirana* fly in the sunshine around the tips of the branches of beech-trees in May and June.

The flowers of hawthorn are very attractive to *Pyrodes rhediana* at the end of May or early in June.

Pyraloides.—*Pancalia leuwenhoeckella* resorts to daisy flowers in middle May, and may then often be captured in large numbers whilst resting motionless in the afternoon sun.

In May the larvæ of *Butalis senescens* make little web-galleries amongst moss at the roots of thyme.

The larvæ of *Butalis siccella* live in long galleries, composed of sand and silk interwoven, attached to half-buried stems of *Thymus serpyllum* and *Lotus corniculatus* in early May.

The larvæ of *Butalis variella* are to be found about the middle of May, making long tubes of silk and sand interwoven, and attached to half-buried twigs of *Calluna vulgaris* and *Erica cinerea*.

In May search or beat *Genista anglica* for larvæ of *Depressaria costosella*.

Towards the end of May the larva of *Depressaria nanatella* draws the two edges of a leaf of the carline thistle together and feeds in the roll thus made. The white shiny surface of the leaf being exposed makes it conspicuous.

Larvæ of *Depressaria conterminella* are to be collected from osier and sallow in late May and early June.

In the beginning and middle of May larvæ of *Depressaria cnicella* are to be found on *Eryngium*, the dirty brown appearance on the crown of the plant often making their whereabouts known, but they are also found in rolled-up leaves. Stout gloves and a good knife wanted.

In May (at Southend) a fine plant of *Conium maculatum* gave larvæ of *Depressaria alstroemeriella*, which produced a fine series of imagines in July (Elisha).

The larva of *Lita suaedella* spins down the small fleshy leaves of *Suaeda fruticosa* to the stem, thereby concealing its presence. It is

full-fed about the middle of May, and pupates in the sand or mud below the plant.

The larva of *Lita leucomelanella* feeds in the shoots of *Silene maritima*, sometimes spinning them down to the stones below, or burrowing down them for a short distance. It leaves its burrow before pupation and is full-fed in May.

By nipping off suspicious-looking *Lychnis* (*L. diurna*) buds in May, the larva of *Lita viscariella* is to be obtained.

In the middle of May the roots of sea-plantain should be collected for larvæ of *Lita plantaginella*: it can, however, be obtained much more easily in rootstocks of *Plantago coronopus* than in those of *P. maritima*.

At the end of May heathery moorlands give *Gelechia ericetella* in abundance.

At the latter end of May, at Farmton, twisted shoots of *Lotus corniculatus* produced larvæ, from one of which, at the latter end of June, appeared a Gelechiid, which Mr. Stainton pronounced to be probably *Anacampsis cinticulella*, which feeds on the continent on *Genista* (Threlfall).

The twisted shoots of honeysuckle should be collected for larvæ of *Brachmia mouffetella*, which feed in white silken galleries; the twisted shoots of *Genista tinctoria*, for larvæ of *Gelechia lentiginosella*.

The larvæ of *Anarsia genistae* should be collected in June, when they are feeding on the shoots of *Genista tinctoria*. The larvæ of *A. spartiella* feed on shoots and flowers of furze at about the same time.

Drooping shoots of spindle contain larvæ of *Hyponomeuta plumbellus*, and the webs on the branches larvæ of *H. cagnagellus*.

Pyralides.—The larvæ of the first brood of *Botys asinalis* may be found on *Rubia peregrina* in May, but require a little searching for, though their eating is conspicuous. They will eat *Galium aparine* in confinement if their food-plant be not procurable.

The twisted tops of flea-bane (*Inula*) should be collected for larvæ of *Ebulea crocealis*.

Crambides.—The larvæ of *Crambus salinellus* should be searched for in May and June under stones resting on *Poa* grass. Turning over the stones exposes the tubular gallery attached to the lower whitish sheaths of the grass towards the roots, or to the stone itself.

At the end of May the blackish larvæ of *Phycis betulella* should be collected from the rolled-up leaves of birch.

The larva of *Rhodophaea marmorea* feeds on dwarf sloe in May and June, generally choosing low, stunted bushes, and spinning the leaves together in a web.

During the whole of the summer months (May-August) the larvæ of *Myelois pinquis* inhabit the living bark of ash, frequently pollard-trees, never affecting any dead or decayed portions of a tree nor penetrating into the wood. It does not eat far into the bark, however thick, and a few long black grains of frass block the entrance. This frass is characteristic, and should be looked for when searching a tree on any projecting bosses, as well as on the spreading foot, for stray grains of frass detected below afford a good clue to the situation of the mine above (Buckler).

Nephopteryx angustella appears in the beginning of May and continues on the wing till nearly the end of June; in hot seasons a partial second-brood appears in September and October. The egg is deposited on the fruit of the spindle-tree, generally on the underside, and frequently between two berries; the newly-hatched larva at once bores into the berry, closing the entrance with silk, and is then difficult to find: as it gets larger it passes to another berry, and its presence may then be detected by the frass protruding from the hole through which the larva has eaten into the fruit. By putting a supply of rotten wood into the breeding-cage for the larvæ to spin up in, almost every larva will produce a moth (Machin).

Cymatophorides.—When birch leaves are well out, in early May, search for rolled-up leaves. Many will contain larvæ of *Asphalia flavicornis*.

Geometrides.—Sleeving larvæ is perhaps one of the most economical, if not scientific, means of rearing lepidoptera successfully; an excellent account of the *modus operandi* of dealing with the larvæ in sleeves is given by Mr. Alderson (*Ent. Rec.*, iii., pp. 64-65).

The larvæ of *Phorodesma smaragdaria* should be collected after hybernation during May. Essex marshes, Benfleet, Canvey, &c.

The larvæ of *Phorodesma smaragdaria* love the sun, and bask on all the sheltered plants; in confinement they prefer southernwood to sea-wormwood, and reach quite normal size with plenty of food, sun, air and space.

The larvæ of *Geometra papilionaria*, almost full-fed, are to be found at the end of May firmly attached by the anal claspers to the twigs of birch, alder and hazel. Their resemblance to the catkins is remarkable.

In May search or beat *Genista anglica* for larvæ of *Pseudoterpna pruinata*.

The larvæ of *Pericallia syringaria* are to be found feeding on the low-growing honeysuckle in woods (also affect privet and lilac).

In May the yellow boat- or spindle-shaped cocoon of *Scoria dealbata*, very much like that of *Anthrocera*, but pointed at both ends, is to be found low down on grass stems.

The imagines of *Scodiona belgiaria* can usually be taken on the wing in May, when sweeping heaths for *Agrotis agathina* (Moberly).

Lobophora halterata emerges in May, and has no objection to sitting in the full rays of the sun on aspen trunks. It flies naturally after dusk, the males searching up and down the trunks of the aspens for the ♀s, and only flying at a short distance from the trees. In the evening search the trunks for the species after pairing has taken place.

During the first week in May the young larvæ of *Scotosia vetulata* mine the young shoots of *Rhamnus catharticus* and *Rhamnus frangula*, their presence being indicated by the drooping condition of the young twigs. After a week or so they emerge from the mine, and live in the shelter made by spinning two or three young leaves together.

The larvæ of *Scotosia rhamnata* are to be found on buckthorn from the middle of May into early June, and should be beaten for. The young mining larvæ of *Scotosia vetulata* should also be searched for in May on *Rhamnus*, at which time their presence is indicated by the flaccid and drooping condition of the succulent twigs; in a week or so

they fasten two or three leaves together and reside therein; [later it rolls a single leaf or uses two fastened face to face (Newman).]

Beat nettles into a newspaper at the end of May and beginning of June. You will obtain larvæ of the Plusias, and a pea-green very ungeometer-like looking caterpillar with humped back. This is the larva of *Eubolia limitata* (Arkle). [*? Botys verticalis.*]

Junipers should be beaten in May and June for the larvæ of *Thera simulata*. The imagines are to be taken on the junipers at night in July and August.

The larvæ of *Cidaria silaceata* from the May brood feed up well and rapidly on *Circæa lutetiana* and *Epilobium hirsutum* and *E. montanum* in June and July, many emerging in August, but some pupæ going over until the following May.

The imagines of *Phibalapteryx vitalbata* are on the wing in May, flying rapidly along hedges where clematis grows, at dusk. A second brood flies similarly in August. (Larvæ may be beaten in late June and July.)

At the end of May and June, in any locality where *Acidalia subsericeata* is known to occur, work well the herbage around the roots of dwarf bushes, low down near the ground; the insect nearly always hides in such places during the day.

At the beginning of May the fullfed larva of *Eupithecia debiliata* spins two or more of the young spring leaves of *Vaccinium myrtillus* together. It lives within the chamber thus formed.

Beat and search spruce in May for imagines of *Eupithecia pusillata*.

Towards the end of May the larvæ of *Eupithecia pumilata* may be beaten from furze blossoms.

Sallow-catkins collected in May will sometimes give a plentiful supply of *Eupithecia tenuiata*. (Select catkins from bushes growing in a variety of places.)

In the last week of May the flowers of maple (*Acer campestris*) should be first searched and then beaten for larvæ of *Eupithecia subciliata*. The larvæ feed on and in maple bloom in May (ninety larvæ beaten May 22nd, in one year, and seventy on May 16th, another year, whilst the next year many were beaten May 30th). They feed up rapidly, pupate in or near the surface of the soil or among the food-plants, and are very easy to rear.

Drepanulides.—Beating in May for "hooktips" is often profitable. *Drepana cultraria*, *lacertinaria*, *falcataria* and *binaria* are abundant in most southern woods with the right growth. The males of *D. cultraria* fly about freely in the sunshine, and sometimes those of *D. binaria* are to be seen flitting in the glades of the woods of our south-eastern counties. The Fairmead district of Epping Forest is a good locality for *D. binaria*.

Imagines of *Drepana binaria* (*hamula*) may be passed over for *Orgyia antiqua*: they fly in the hot sunshine up to midday around young oak-trees, and are sometimes common.

The eggs of *Drepana cultraria* (*unguicula*) may readily be obtained by enclosing a captured female in a muslin sleeve on a branch of a growing beech-tree.

Pterophorides.—The larva of *Eucnemidophorus rhododactylus* feeds

in late May just beneath the leaf overlapping a rosebud, eating into the bud from the side; also in similar positions at the ends of the young rose-shoots.

A form of *Platyptilia pallidactyla* (*bertrami*), or a distinct species, feeds on the leaves of *Senecio* in May and June, and emerges in the latter month; has been recorded as yet from Carlisle, Glasgow dist., Aberdeen dist., and various other northern localities.

During the first fortnight of May the larva of *Oxyptilus heterodactylus* (*teucrii*) is to be found full-fed on the leaves of *Teucrium scorodonia*. The larva eats a small round hole into the stem about two joints down, which causes the tip of the plant to droop, and then feeds on the growing leaves around. It is very local.

The larvæ of *Oidaematophorus lithodactylus* when young are to be found in the terminal shoots of *Inula dysenterica;* later on they hide during the daytime, but may easily be got after dark, when they feed, exposed, on the surface of the leaves (South).

In early May search golden-rod in shady places for larvæ of *Leioptilus tephradactylus*. Their presence is easily detected, as they strip the leaves pretty successfully.

The early brood of *Leioptilus microdactylus* is well out among *Eupatorium cannabinum* in late May and early June.

The larvæ of *Aciptilia galactodactyla* are to be found on the underside of the central leaves of burdock in May; the riddled state of the leaves indicates the plants affected.

Sesiides.—Where the bark joins the wood of an oak-stump (cut down two years previously) the thrown-out frass indicates where the larvæ of *Sesia cynipiformis* (*asiliformis*) have been at work. Dig out the cocoons in the middle of May, or saw off about four or five inches of the stump earlier in the year.

In early May the larvæ of *Sesia musciformis* (*philanthiformis*) are to be found feeding on the stems of sea-thrift (*Statice armeria*), which grows in profusion in many coast districts. The stunted plants scattered in the clefts of almost bare and waterworn rocks are those selected. A little red patch on the cushion of thrift betrays the work of the larva, and after a little practice affected plants may soon be recognised at a distance. The larva appears never to select plants growing luxuriantly in ordinary soil.

Lachneides.—The larvæ of *Malacosoma castrensis* (small in May and still gregarious) are exceedingly abundant on a large variety of plants on the saltings of the Kent and Essex coasts, and will feed freely on common garden chrysanthemum.

During May the larval nests of *Lachneis lanestris* should be searched for on hawthorn and blackthorn.

One of the most successful food-plants on which to rear *Poecilocampa populi* is alder. The larvæ thrive excellently on it (Bowles).

The larva of *Lasiocampa quercûs* should be searched for in May; generally rests well up on branches of hawthorn, maple, &c., on hedges and outskirts of woods; it wants looking for even when nearly or quite full-fed.

In May the larvæ of *Pachygastria trifolii* are to be found in abundance on Romney Marsh, on the tufts of a wiry grass growing on

the shingle just above high-water mark. These larvæ give the rare yellow aberration only; the larvæ of the darker forms occur on the Wallasey sandhills, Lyndhurst (on heather), Devon and Cornish coasts, &c.

At the end of May the larva of *Eutricha quercifolia* should be on blackthorn and buckthorn, resting low down during the day; sought it comes up and feeds by night, and is common on Wicken Fen.

"Cannock Chase.—*Gastropacha ilicifolia*, May 17th, in repose, clinging to a dead sprig of heather, apparently but lately emerged from the pupa. From its great resemblance to a withered leaf it would not probably have caught my eye, had I not luckily knelt down within a few inches of it to pin a small Tortrix.—W. S. Atkinson, *Zoologist*, p. 3396 (1852)."

Saturniides.—The eggs of *Saturnia pavonia* are to be found on ling, sallow, &c., laid round and round a twig, and not at all unlike a small bunch of dried flowers of heather.

Sphingides.—The last week in May, in early seasons, is the time for taking *Macroglossa bombyliformis*, hovering over flowers in the morning and midday sunshine; *Ajuga reptans* is a specially favourite plant; the ♀s may sometimes be seen egg-laying on scabious.

The imagines of *Macroglossa fuciformis* fly in the morning and afternoon sunshine, in late May and early June; specially fond of rhododendrons, and blue bugle.

When rhododendrons are in bloom (end of May) they should be worked systematically at dusk for *Choerocampa porcellus*.

Simæthides (Choreutides).—The larva of *Simaethis pariana* should be searched for in June on hawthorn and apple, on which plants it feeds, spinning a silken web on the surface of a leaf, under which it lives.

Notodontides.—During May it pays to search sallow-bushes, not beat them, for larvæ of *Clostera reclusa*.

The birch-trees on the Muckross Peninsula, at Killarney, are reported to be the exact haunts of *Notodonta bicolor* in Ireland. The imago appears in May, the larva in June.

Notodonta trepida is best taken from the middle of May to the middle of June upon the trunks of oak, about one to four feet from the ground (Mawson),

The trunks of trees in beechwoods should be well worked in late May and early June for *Stauropus fagi*.

Noctuides.—An overhanging bank, a hole where a tree has been blown down, the edges of a quarry or chalkpit, a landslip, banks on sandhills, banks in lanes where the soil or gravel has fallen away, should be first searched carefully for lepidoptera, then gently scraped with a stick to disturb those overlooked (Gregson).

During late May and early June the reedbeds should be swept after dark for the larvæ of *Leucania straminea*. I have seen the larvæ near the tops of the reeds in large numbers, where they are rather conspicuous, and used to pick off those within reach, and sweep for the

more distant ones with a net. The larva pupates in or on the soil, and emerges without much trouble.

In May the full-fed larvæ of *Leucania littoralis* are to be found feeding by night on *Ammophila arundinacea*, and hiding by day under the sand at the roots of the same plants.

The larvæ of *Tapinostola elymi* feed on *Elymus arenarius* in coast districts and should be worked for during May. They can be shaken out of the plants by day.

Night-beating for larvæ, especially after 10 p.m., is the most productive means of capture possible, and many larvæ are obtained of species which do not always come to sugar, such as *Noctua ditrapezium*, *Aplecta tincta*, *Triphaena interjecta*, &c. I once beat out of the birches and sallows at Tilgate over 500 larvæ in one night between 10.30 p.m. and 1 a.m., including sixteen *N. ditrapezium*, twenty *Triphaena fimbria*, eight *Aplecta tincta*, &c. (Fenn).

The larvæ of *Noctua ditrapezium* should be obtained by the middle of May (they can be collected earlier); they feed by night, late, and have been taken by searching with a lantern in almost all woods on the outskirts of London. The larva occurs on a variety of plants—birch, apple, whitethorn, sallow, bramble, bracken, stinging-nettle—on Hampstead Heath, Wimbledon Common, &c.

At the end of May, 1870, I beat three larvæ of *Agrotis subrosea* in the evening twilight from *Andromeda polifolia*, L. In captivity they also ate several species of willow (Berg).

Towards the end of May tracks made by crawling larvæ may be seen on the coast sandhills at the edges of the patches of dwarf willow (*Salix repens*). If one of these be traced, it will be found to end abruptly at a small upheaval in the sand; under this is the larva of *Actebia praecox* (Almond). The larvæ are very frequently stung by ichneumons. Sea-birds (gulls) look for their nocturnal tracks on the sandhills and dig them up for food in the day-time; full-fed about June 13th-20th (Kane).

From tufts of *Salix repens* on the Culbin sands, on May 24th, I dug out 156 larvæ of *Actebia praecox* and several of *Agrotis vestigialis* (Norman).

The heather can still be swept on the open moors, &c., for larvæ of *Agrotis agathina* and *Noctua neglecta*.

In sweeping heather for *Agrotis agathina* in May and June it is well to select the larger larvæ only as being less likely to be ichneumoned; the parasites appear to leave the "stung" larvæ when the latter are about two-thirds grown (Collins).

In late May (and early June), *Hydrilla palustris* comes to light in Wicken Fen. It is generally supposed that that part of the Fen nearest to the village is the most productive for this species.

The imago of *Xylomiges conspicillaris* is to be found in May and early June, on old stumps, fences and gate-posts, and looks just like a splinter of the wood on which it sits.

Imagines of *Calocampa vetusta* and *C. exoleta* come to sugar in April and May; May 14th, for *Calocampa vetusta* and *C. exoleta* on May 27th, are my latest records (Kane).

The larva of *Taeniocampa populeti* is to be found at the end of May between flatly united leaves of poplar. The larva of *Tethea subtusa* is to be found at the same time and place, but in leaves folded upwards upon themselves.

In May the larva of *Taeniocampa populeti* spins two poplar (or aspen) leaves together, one upon the other, and lives between. The larva is easily seen against the light. It is very transparent, and almost colourless, of a yellowish-white tint with a black head. Often high up on tall trees.

During May the larvæ of *Taeniocampa gracilis* may often be found in marshy places, in tents formed of leaves of *Spiraea ulmaria* spun together.

During May it pays to search sallow-bushes, not to beat them, for larvæ of *Tethea retusa*, which prefers sallows with leaves of thin texture; they are also found on willows.

In May the larvæ of *Dyschorista upsilon* can be obtained in abundance beneath the loose bark of willow trees, where they hide by day. They go up at night to feed. The larvæ of *Catocala nupta* may often be found in the same places.

At the end of May beat elms for the larvæ of *Calymnia pyralina*, *C. affinis*, and *C. diffinis*. The larvæ of *C. affinis* may be beaten from the lower branches, and though *C. diffinis* often occurs commonly in the same localities as its congener, the larvæ are generally much more difficult to obtain. Do they feed higher up the trees?

At the end of May larvæ of *Mellinia gilvago* are usually abundant locally on elm, especially on the flowers and seeds of wych-elm.

The larva of *Cosmia paleacea* is to be found at the end of May or beginning of June on birch and aspen. Beat the lower branches hard. The larva is very sickly-looking, and, before I knew them, I used to throw them away thinking they were ichneumoned (Corbett).

Full-fed larvæ of *Cleoceris viminalis* should be searched for in late May and early June when they live between sallow leaves or in spun-up terminal bunches.

The last week in May and the first week in June are the best time to work *Silene* flowers for *Dianthoecia caesia* and *D. capsophila*.

In the last week of May (and first in June) dusking over flowers of *Silene*, in the neighbourhood of Folkestone and Gosport, produces *Dianthoecia albimacula*.

The larvæ of *Polia nigrocincta* are to be found by day around the roots of *Statice armeria* or on the blossoms by night (Newman). We believe *Plantago maritima* is the more usual food-plant.

Heliothis dipsaceus flies abundantly at the blossom of *Lotus corniculatus* (with which the denes near Great Yarmouth are covered) in late May and early June (Harmer).

During May the almost fullfed larvæ of *Toxocampa pastinum* may be found feeding on *Vicia* by night, and by searching among the herbage at the roots by day.

The larvæ of *Catocala nupta* feed on willow and poplar, hiding under loose bark during the day, and crawl up to feed after dusk.

Arctiides.—"To find the larvæ of *Nudaria mundana*, note some wall of loose stones (a 'dry stone dyke') where the imagines are abundant, and, in May, lift the upper stones and examine their undersides. The larvæ will be found feeding on a green confervoid growth that covers the stones" (F. B. White).

The larvæ of *Setina irrorella* feed on a ground lichen, which grows amongst the grass, often just outside the tide-mark. They afterwards

feed fairly well on the grey lichens, which are not uncommon on apple and other trees (Crewe). Also occurs inland, at Box Hill, &c.

In May the larvæ of *Lithosia caniola* have been found commonly on Romney Marsh, on the low plants growing on the shingle just above high-water mark.

Papilionides.—In May the flowering stems of *Cardamine pratensis* and *Sisymbrium officinale* should be collected for the orange-coloured eggs of *Euchloë cardamines*, which are usually laid (one on each flower-head) on the pedicel of a flower nearly over.

The long spindle-shaped eggs of *Leucophasia sinapis* are to be found in May on *Vicia cracca* and *Lathyrus tuberosus*.

Larvæ are exceedingly abundant this month. Among butterflies the Argynnids—*Argynnis adippe* (violet, &c.), *Brenthis euphrosyne* (violet, &c.), *B. selene* (violet, &c.)—*Polygonia c-album* (hop, nettle, currant), *Limenitis sibylla* (honeysuckle, often prefers small plants), *Apatura iris* (sallow), &c., are to be obtained.

The eggs of *Nemeobius lucina* are readily found on the underside of cowslip leaves, not more than four or five on a leaf, in woods where the butterfly occurs, at the end of May and beginning and middle of June (Porritt). One may safely reckon on finding them about June 20th (Raynor).

JUNE.

June is, perhaps, *par excellence*, the month most beloved of the field-naturalist. Insect life is rapidly reaching its maximum in variety and number of species, and the lepidopterist is now exceedingly busy and alert. The first fortnight of June is always the most prolific in our southern woods, a couple of hundred species often falling to the collector in a single day's work in Kent—distributed over butterflies (*Melitaea athalia, Brenthis euphrosyne, B. selene, Nemeobius lucina*, &c.), Sphingids (about half the British species), Anthrocerids (*Adscita statices, Anthrocera trifolii, A. hippocrepidis*, St.), Arctiids (*Nemeophila plantaginis, Euthemonia russula, Lithosia aureola, Calligenia miniata*, &c.), Sesiids, Notodonts, Crambids, &c., although the bulk of the species will, if properly sought, be Geometrids (*Scoria dealbata*, Acidalias, &c.), Noctuids, Tortricids, and the various sections of the old Tineina. In the forest districts where the large butterflies still exist, the end of the month is very fruitful, and visitors to the New Forest perhaps prefer late June and early July to any other period of the year. On the chalk-hills almost all the British species of the Lycænids are on the wing, whilst, in the other superfamilies quite a new fauna is obtainable, *Adscita globulariae*, indeed, being confined to our southern downs. In early June the lepidopterist wants, in fact, to be everywhere—the early coast Noctuids—*Mamestra albicolon, Leucania littoralis, Agrotis ripae*, &c.—attract him; the rare fen species—*Hydrilla palustris, Meliana flammea*, &c.—tempt him; the marshes call him for *Leucania obsoleta, Senta ulvae*, &c., whilst the chalk-hills and the woodlands are teeming with life. The collector usually gets too much into a groove, he is tempted, when he knows how, when, and where, to get a few good local species, to work for these year after year and to fill the blanks in his cabinet by exchange. It is much better to go afield, and the true naturalist should be equally at home on the southern downs

and northern moorlands, in the pine forest and beech-wood, on a bare, bleak coast-line, or on a savage mountain-side. Each locality wants learning, each requires a special knowledge, and he is the best naturalist who can wrest from nature her secrets, under the most varied conditions that she knows how to present to him so admirably. His own immediate home will always, of necessity, demand the most attention, but week-ends, and occasional holidays, should open up new ground much farther afield, and give the naturalist new views of nature under some one or other of the delightful phases that she everywhere presents to him. It is worth while to remember that sheltered spots, *e.g.*, the sheltered sides of trees and palings, hollows on hillsides, &c., are the most productive situations, especially after heavy storms of wind or rain, and, after bad weather, many rush, grass, and ground insects may be freely beaten from bushes, and from thatch, especially if the latter be on heaths or moorland where there is little shelter. In the middle of June the Breck district of Norfolk and Suffolk are particularly interesting, and the special fauna very attractive to the lepidopterist—*Acidalia rubricata*, *Lithosteye griseata*, *Agrophila trabealis* (*sulphuralis*), &c.—whilst the nearness of the fens—Wicken and Chippenham—is a further temptation to visit this interesting district. The woods of Northants are celebrated for their rarities—*Thecla pruni*, &c.—and the coasts of Cornwall and Devon for the much-persecuted *Lycaena arion*. Among the smaller fry in the imaginal state probably two-thirds of the whole of the British species in the superfamilies *Nepticulides*, *Lithocolletides*, *Elachistides*, *Coleophorides*, *Argyresthides* and *Gelechiides* are on the wing at some period during the month. The collection of these, however, in the imaginal state, is, in Britain, of very little scientific interest, as most of the imagines are well known, and any increase in our knowledge must be largely in the direction of habits and detailed descriptions (on modern lines) of the insects in their earlier stages. Trunk-searching is an especially valuable mode of collecting some of these smaller species in the perfect state, but it also gives many of the larger species in abundance—*Stauropus fagi*, *Boarmia consortaria*, *Tephrosia extersaria* *T. crepuscularia* (*biundularia*), *Macaria liturata*, &c., being among those that are best obtained in abundance by this mode of work. Flowers at dusk are also worth working; red valerian is stated to be most attractive to the Plusias—*bractea*, *festucae*, *iota*, *pulchrina*—to the Dianthœcias—*capsophila*, &c.—whilst wild-sage flowers attract swarms of Noctuids and Geometrids at Portland, among other good species being *Agrotis simulans* (*pyrophila*). Sugar often fails in dry and hot weather, and flowers of grass, sedge, honey-dewed leaves, &c., should then be searched for Noctuids. Several scores of Noctuids may often be captured at sedge-blossoms on the Deal sandhills when the sugar proves blank. It is well, too, to carry a few small calico bags with you in which to place the seedheads of different plants collected for larvæ—*Silene* for *Dianthoeciae*; toad-flax (*Linaria vulgaris*) for larvæ of *Eupithecia linariata*; flowers of foxglove (*Digitalis purpurea*) for *E. pulchellata* (especially if the flowers are partly closed up by being spun together); seed-heads of nettle-leaved bell-flower for *E. campanulata*; seeding flowers-heads of *Scabiosa arvensis* and *S. succisa* for larvæ of *Eupoecilia flaviciliana*; cowslip seed-heads for *E. ciliella*; and spun-together tops of sallow-shoots for *Peronea hastiana*, although most of

these are certainly better obtained later in the year in normal seasons. The coast of the Isle of Man is most productive from the middle of June and on into July, and Birchall notes that, in 1876, at this season of the year, the flowers of *Silene maritima*, growing in a little recess, about ten feet across, among the rocks on the shore near Douglas, of easy access, produced 105 *Dianthoecia caesia*, 32 *D. capsophila*, 4 *Plusia pulchrina*, 12 *Eupithecia venosata*, and many other insects during twenty evenings, the specimens being captured without moving from the spot, the captor, indeed, being seated on a stone most of the time. The hard-working collector, with resource, ought not, even in bad seasons, to complain of the results to be obtained during this month if his energy be put into entomology, and his heart be not set on obtaining further supplies of some rare or local species that may temporarily fail.

Tineina (unclassified).—In the middle of June the tree-trunks should be searched for Micro-lepidoptera—often quite the best mode of collecting at this time of the year. In June the larvæ of *Gracilaria tringipennella* are in abundance in leaves of *Plantago lanceolata* at Castle Hill, Scarborough (and elsewhere), and the larvæ of *Coleophora alcyonipennella* on every plant of *Centaurea nigra* (Elisha).

Tineides.—In June collect hart's tongue for cases (with pupæ) of *Psychoides verhuella*: keep dry and you will breed many; I failed for many years by keeping them too damp (Hodgkinson).

Adelides.—In June the flowers of *Cardamine pratense* should be worked for *Adela rufimitrella*.

Plutellides.—In early June the pale green larvæ of *Hypolepia sequella* may be beaten from maple. They are exceedingly active.

From the beginning to the middle of June the larvæ of *Plutella annulatella* are to be found on *Cochlearia anglica*.

The larva of *Harpipteryx scabrella* may be beaten into an umbrella from hawthorn early in June. It is not unlike that of *Cerostoma radiatella*, but has a white stripe down the back, and I do not think it is quite so lively. It is easy to feed up, and spins a beautiful cocoon of white silk, boat-shaped, with a triangular transverse section (Richardson).

Elachistides.—The flowering-stems and leaves of *Epilobium* should be worked for the Lavernas—*Laverna conturbatella* (terminal leaves), *L. epilobiella* (in tops among leaves and flowers), *L. decorella* (in stems).

At the end of June the larvæ of *Laverna subbistrigella* may be obtained on *Epilobium montanum*. They live within the pods on the seeds. The infested pods are usually thickened and shortened, sometimes slightly distorted.

The larva of *Laverna miscella* mines the leaves of *Helianthemum vulgare* in June.

In June the larvæ of the first brood of *Chauliodus chaerophyllellus* are to be found on *Heracleum sphondylium* and *Pastinaca sativa*, mining at first, and making brown blotches in the leaves, and then feeding on the under-surface of the large lower leaves beneath a slight web, and pupating among rubbish on the ground. The second-brood feeds similarly in August and September.

In May and early June the larva of *Elachista scirpi* makes short broad mines in the upper half of the leaves of *Scirpus maritimus*.

In the middle of June the larva of *Elachista trapeziella* mines the leaves of *Luzula pilosa*.

The larvæ of *Elachista adscitella* are to be obtained in the stems of blue moor-grass (*Sesleria caerulea*) the second week in June (Hodgkinson).

In the middle of June the larva of *Nannodia eppelsheimi* makes conspicuous white blotches in the leaves of *Silene nutans*. This insect is still waiting to be added to the British fauna.

In June I find the larvæ of *Cosmopteryx druriella* in leaves of wild hop, at Sevenoaks (in a field adjoining the Bat and Ball Station) (Elisha).

Gracilariides.—The larvæ of *Gracilaria auroguttella* feed in cones on *Hypericum perforatum* in June.

Towards the end of June the ash-trees in the neighbourhood of Mickleham and Box Hill, gave larvæ of *Zelleria hepariella*. Sometimes the close white cocoons are found on the leaves during July.

Argyresthiides.—Examine well-grown plants of *Echium vulgare* on exposed slopes during the second week in June. *Douglasia ocnerostomella* sometimes abounds, flitting about such plants from 2 p.m. to 4 p.m.

The larva of *Argyresthia andereggiella* is to be found in June, beneath a web, spun near or at the end of the twigs of the crab-apple.

Coleophorides.—The black cases of *Coleophora vibicella* are readily found on the stems and leaves of *Genista tinctoria*, the blotches on the leaves are quite conspicuous, and the species, although very local, is sometimes exceedingly abundant.

The larvæ of *Coleophora genistaecolella* are to be found abundantly in June on *Genista anglica*.

At the base of the rocks at Whitbarrow, on the wild marjoram, during the first week in June, the larvæ of *Coleophora albitarsella* may be obtained in plenty (Hodgkinson).

Lithocolletides.—The larva of *Lithocolletis scopariella* makes an inflated mine along a broom twig. The pupæ should be obtained towards the end of June.

Nepticulides.—The larva of *Nepticula poterii*, in early June, mines the leaves of *Poterium sanguisorba*.

Tortricides.—The larvæ of the moorland Tortricids are now to be collected in great abundance—among others, *Tortrix viburniana* (*Myrica gale*, *Vaccinium*), *Peronea autumnana* (*Myrica*), *P. caledoniana* (*Myrica*), *P. maccana* (*Myrica*), *Grapholitha geminana* (*Vaccinium*), *Hypermoecia angustana* (sallows), &c.

The larvæ of *Tortrix piceana* are to be found in early June feeding on *Abies picea*.

Tortrix branderiana may be obtained freely at the end of June, flying from sunset to dark over the tops of aspens in woods.

The green larva of *Tortrix lafauryana* is to be found in June, making an upright tube of joined leaves on the top of a shoot of *Myrica gale*.

At the end of June, visitors to Wicken Fen should collect the rolled-up leaves of dewberry (*Rubus caesius*), for larvæ of *Tortrix dumetana*.

The imagines of *Peronea shepherdana* are to be bred from rolled-up leaves of *Spiraea ulmaria*, collected in June.

The larva of *Peronea permutana* feeds in bound-together leaves of *Rosa spinosissima*, generally on the lateral shoots, in June, July, and August, spinning a white silken web among the leaves. It occurs at Wallasey and Penmaenbach (near Conway).

The larvæ of *Sciaphila conspersana* (*perterana*) feed in June, in the blossoms of *Chrysanthemum*, *Hieracium*, and other *Compositae*. Their presence may be recognised by the ray-florets being turned down so as to form a covering for the larva. The insect is more common in coast districts than inland.

The examples of *Sciaphila conspersana* (*perterana*), taken on the saltmarsh at Southend, "appear to be very different from those captured in the neighbourhood of Dover, on the chalk cliffs, not only in colour, but in texture. They may ultimately prove to be a distinct species." (Howard Vaughan). [This has never been reported upon.]

The larva of *Ephippiphora grandaevana* feeds in June on *Tussilago*, and makes very long curious tubes in the sand (Zeller). The imago also occurs in July and August among *Petasites* in the Alps.

Ephippiphora grandaevana flies at the end of June and during July, at dusk, with a jerky flight of a few yards, very close to the ground. The species can be taken more freely by looking over the leaves of colts-foot with a lantern, generally sitting on the top of the leaves of the smallest and most stunted plants (Gardner).

June (middle to end), *Ephippiphora gallicolana* is now out, flying swiftly over the tops of oak-trees and bushes from 2 till 7 p.m.

The imago of *Semasia woeberiana* flies in the sunshine among laurel, cherry, and other fruit-trees in June, and again in August.

The imagines of *Semasia spiniana* fly in June, in the afternoon sunshine around and above hawthorn hedges. May often be obtained abundantly in the morning by beating into an umbrella.

The larva of *Semasia janthinana* feeds on the berries of *Crataegus oxyacantha*, uniting them in twos or threes by means of a gummy substance, so that it can pass from one to the other without exposing itself. It eats the pulpy part of the fruit only without touching the skin. It pupates in August (Lafaury). Probably occurs later in Britain.

In June the larvæ of *Spilonota rosaecolana* feed in shoots of rose, drawing together the leaves and eating out the young leaf-buds and flower-buds, and thus doing great damage in gardens.

Larvæ of *Spilonota aceriana* may be collected in the middle of June. They feed in the terminal buds of poplars and aspens. The presence of the larva is indicated by a tube of frass projecting from the end. Insert the cut twigs in damp sand.

In June the imagines of *Spilonota servillana* fly in the afternoon sunshine, and also at dusk among sallow-bushes in the south of England. The larva makes a swelling in the twigs of sallows, turning to a pupa within the swelling thus formed.

The larvæ of *Grapholitha minutana* may be obtained in June feeding between flatly united leaves of black poplar.

The imago of *Phoxopteryx upupana* flies very swiftly over the tops of oaks, birches, and other trees in their immediate vicinity, from 2 p.m., or a little earlier, until an hour before sunset, in early June.

The blossoms of fir (*Pinus sylvestris*) should be collected in early June for larvæ and pupæ of *Sericoris bifasciana* and *Retinia sylvestrana*.

The last week of June and the first week of July are the time to find the larva of *Euchromia purpurana*. It lives underground in a silken tube, and gnaws the roots of *Sonchus arvensis* and *Taraxacum officinale* externally.

The imagines of *Penthina sellana* fly swiftly by day about grassy banks, where *Centaurea nigra* grows, during June and July. They may be easily overlooked for a *Dichrorampha*.

Pyraloides.—I think lepidopterists would often do better if they "smoked" for insects, especially the smaller ones; it is possible on the coast sandhills to take thousands of specimens in a day if one only had the time to set them; before I tried "smoking" I could only get 5 or 6 *Tachyptilia temerella* in a morning, with the smoke I can get 50 in an hour, and the same with other Gelechiids. I use old rags or brown paper, or in fact, any paper made into touch-paper, with saltpetre melted in water and dried again. A whiff or two of this sent among the roots of grass, etc., will make most things move (Baxter).

June is the great month for larvæ of Depressarias—flowers and leaves of furze, broom, and *Genista* give *Depressaria costosella*, *D. umbellella*, *D. assimilella*, &c.; heads and leaves of *Centaurea scabiosa* produce *D. liturella*, *D. pallorella*; heads and leaves of umbelliferous plants yield *D. arenella*, *D. purpurea* (*vaccinella*), *D. capreolella*, *D. angelicella*, *D. yeatesiella*, *D. applanella*, *D. granulosella*, *D. depressella*, *D. pimpinellae*, *D. weirella*, *D. ultimella*, *E. nervosella*, &c. (*Anthriscus* and *Angelica* are the most frequently chosen).

The larvæ of *Depressaria angelicella* are to be found twisting and crumpling the leaves of *Angelica sylvestris* in June.

The larvæ of *Depressaria atomella* are to be found in the shoots of *Genista tinctoria* about the beginning of June.

The larva of *Depressaria carduella* mines the leaves of *Cnicus lanceolatus*, and other thistles, in June, moving freely from plant to plant.

In the last fortnight of June the larvæ of *Depressaria albipunctella* and *D. chaerophyllella* should be obtained on *Chaerophyllum temulentum*.

The imagines of *Enicostoma lobella* may be beaten from blackthorn in June. Loughton used to be a well-known locality.

In early June the unexpanded flower-buds of the common mallow are tenanted by a small white larva, which produces *Gelechia vilella*.

In the early part and middle of June the larva of *Anacampsis albipalpella* feeds on *Genista anglica*: the larva draws several leaves together round the stem, and then eats them half through, thus discolouring them, and forming conspicuous clusters of yellowish-white leaves.

The larvæ of *Cladodes yerronella* may be found in the early part of June feeding on furze.

The larvæ of *Butalis grandipennella* are to be obtained on the furze-bushes, at Wanstead (and elsewhere), about the middle of June.

They make a web, placed along the stems of some years' growth, and a strong pair of cutting-pliers should be requisitioned for snipping off those portions of the stems containing the webs.

During June the shoots of *Lysimachia* should be collected for larvæ of *Doryphora morosa*. Wicken Fen is the best known locality.

In June the terminal shoots of furze which have turned brown should be collected for larvæ of *Anarsia spartiella*.

Spun shoots of *Lotus major*, collected in early June, will give larvæ of *Anacampsis vorticella*.

Near the chalk-pit at Kemsing the larva of the very beautiful *Hypercallia citrinalis* (*christiernella*) lives in the shoots of *Polygala vulgaris*.

In June, plants of *Sedum telephium* are often much covered with the webs of the larvæ of *Hyponomeuta vigintipunctatus*. The larvæ of the second-brood are still more abundant in August.

Crambides.—Crambids are to be disturbed during the day but their usual time of flight is at dusk and after, June and July being their principal months, from 9 p.m.-10 p.m. *Crambus margaritellus* flies low from one grass blade to another in August. *Crambus furcatellus* and *C. ericellus* fly freely in the late afternoon and evening in late June (Reid).

Crambus furcatellus was flying not uncommonly on June 21st, on the grassy slopes between Sprinkling and Styehead tarns, and was, in fact, found on almost every high hill ascended (Geldart).

In the middle of June, the barren denes near Yarmouth should be searched for the long cocoons (placed perpendicularly in the sand) of *Crambus fascelinellus*. They may be found just beneath the sand where *Triticum junceum* is growing. Cocoons are often exposed by the wind.

The imago of *Phycis carbonariella* prefers to rest on burnt places on heaths.

Examine stunted whitethorn and blackthorn bushes, growing on exposed slopes almost anywhere, during the first fortnight in June; you will find the silken galleries of *Rhodophaea suavella* spun close to the twigs.

In June collect the bunches of oak-leaves that are spun together high up on oak-trees for larvæ of *Rhodophaea tumidella*. The bunches low down on the small bushes contain larvæ of *R. consociella*.

During the first week of June the imago of *Cryptoblabes bistriga* should be searched for on oak, or it may be beaten therefrom.

On June 27th, in the Fens around Norwich, in a part of the Fen ankle deep in water, creeping up from the tufts of a small rush, and fluttering among the reeds, was *Schoenobius mucronellus* in swarms—hundreds of them—nearly all males—their flight lasting from 6-8 p.m. (Barrett).

The males of *Chilo phragmitellus* fly freely at dusk by reed-beds, the females must be searched for on the reeds. The males also come freely to light.

Pyralides.—To find the larvæ of the *Scopariae* peel off the moss growing on the north side of shady rocks, large boulders and walls, in spring and early summer, and examine the underside of it. If larvæ

be there the galleries of silk slightly spun upon the moss and the frass will indicate their presence. To rear them, place the tufts of moss in a jam-pot with ground top and cover with a piece of glass (F. B. White).

The rare *Botys repandalis* is reported as having been bred from larvæ found feeding in June, in the heads and young shoots of *Verbascum nigrum*, on the south coast of Devon.

The larvæ of *Pyralis glaucinalis* have been found during May and June in the nest-like bunches of twigs which may often be observed growing at the ends of branches on birch-trees.

Drepanulides.—Stunted trees of beech should be searched for eggs of *Drepana unguicula*, laid on the leaves; those of *D. lacertinaria* are laid on birch leaves or twigs.

Cymatophorides.—In June the larvæ of *Asphalia flavicornis* spin together two or three leaves of birch and live within. On the same bushes (and at the same time), the larvæ of *Phycis betulella* are to be found in twisted leaves. The larvæ of the first-named sometimes spin two leaves together, and sometimes fold one leaf. They sometimes pupate between two leaves and sometimes spin a leaf to the earth.

In June the larvæ of *Asphalia ridens* can best be obtained by looking up into oak-trees, when the larvæ may be seen on the outside branches, lying half-curled between two leaves drawn slightly together. The larvæ must be searched for by day, or beaten by night.

Brephides.—Beat (or search) aspen the first week in June for larvæ of *Brephos notha*; the full-fed larva wants cork or rotten wood in which to make its cocoon.

The larvæ of *Brephos parthenias* are now to be obtained almost full-fed on birch (and those of *B. notha* on aspen); difficult to obtain during the day as they rest between united leaves.

Geometrides.—The long thin delicate cocoon of *Ourapteryx sambucata* is not difficult to find, spun up among ivy twigs; much more difficult to detect on blackthorn, &c.

The imagines of *Epione advenaria* hide low down among bilberry and grass in wood-ridings, but are easily disturbed.

The full-fed larvæ of *Boarmia abietaria* should be beaten from larch, spruce fir, &c., in the early part of the month; they may be fed in confinement on many other plants—birch, &c.

At the end of June the pupæ of *Boarmia abietaria* should be carefully worked for, just below the surface of the ground, at larch, spruce fir, &c.

Boarmia roboraria is best taken at rest in the early morning, but it comes to sugar late at night.

In June a freshly emerged ♀ of *Boarmia roboraria* assembles the ♂s readily; the latter put in an appearance about 12 p.m., and in two nights some forty were taken, about twice that number being attracted.

In June the larvæ of *Cleora glabraria* are to be found feeding on lichens on oak-trunks.

The cocoons of *Geometra papilionaria* are to be found in spun-

together leaves of birch, and are most difficult to find; occasionally the larva uses the edge of moss on tree-trunks as a place to spin up.

In June the larva of *Pseudoterpna pruinata* (*cytisaria*) feeds upon furze (*Ulex europaeus*), *Genista anglica* and *Cytisus scoparius*.

Phorodesma bajularia flies high at sunset in oak woods during June and on to end of month; it prefers broad rides and woodsides.

In early June the Scotch heaths want working for the various forms of *Fidonia atomaria*, which are exceedingly interesting to southern collectors.

The first brood of *Aspilates ochrearia* (*citraria*) is abundant in early June, in its favoured haunts, usually rough grassy tracts on sandhills near the sea. Eggs from these will give a second-brood in August.

The larvæ of *Lobophora viretata* are most easily bred on ivy in captivity, eating every particle, whilst it keeps fresh, except the stem; eggs readily obtained from captured ♀ s. The larvæ stick to a leaf like grim death, while there is a particle left, devouring ribs, stalk, and tissues alike, and do not wander—in fact they feed in uncovered glass jars (Tunaley).

The females of *Bupalus piniaria* are sometimes taken abundantly in June, clinging to grass-stems under the trees on which the larvæ have fed.

Timandra amataria may be taken from June (middle) to July (middle) in abundance, flying at dusk in weedy lanes; and after dark at rest on the grasses and hedgeplants.

The imagines of *Acidalia emutaria* begin to fly directly after sunset, settling on the herbage as soon as it is quite dark; they are then easily found with a lantern. I have found them as early as the second week in June, and as late as the second week in August. They are abundant on the saltings of north Kent, along the ditch-sides of Deal and Sandwich, the tidal swamps of the Freshwater (Yar) district, and the bogs of the New Forest. In the Isle of Wight there are two distinct broods (June and August).

Acidalia rubricata flies most freely about half an hour before sunset, and one gets many in a locality where only individual examples can be walked up in the day or late afternoon (Wratislaw).

I sleeved some young larvæ of *Anticlea berberata* on an English barberry bush, and others on one of the foreign varieties; leaving home for a short time I found on my return the former a good size, and the leaves a mere network, but the latter were all dead and not a leaf nibbled (Riding).

The larvæ of *Scotosia certata* not only feed on leaves of common barberry but they also occur in abundance on the holly-leaved *Berberis* of our gardens (Thornewill).

The second and third weeks in June are usually the most satisfactory in which to beat *Prunus spinosa* for larvæ of *Aleucis pictaria*.

Melanippe hastata flies at noon in June over the wettest part of Orton Moss, it is slow on the wing and easily captured (Armstrong).

In June *Eupithecia isogrammata* and *E. coronata* want a great deal of working for, beating the clematis is of no use at all; a stick must be thrust in and the bush regularly churned; then wait for a few minutes and beat in the ordinary way (Kimber).

The larvæ of *Eupithecia pimpinellata* may be obtained by collecting the seed-heads of *Pimpinella saxifraga*, *Angelica sylvestris*, &c.

The larvæ of *Eupithecia pumilata* are to be obtained, sometimes in abundance, in flowers of gorse, broom, and many other plants.

When the foxgloves are in flower, search the solitary plants growing in the open spaces in, or on, the outskirts of woods, for spun-up flowers containing larvæ of *Eupithecia pulchellata*.

The imagines of *Eupithecia plumbeolata* may sometimes be obtained freely among *Melampyrum pratense*, in woods and meadows, flying at dusk in early June.

Eupithecia rectangulata swarms in some apple-orchards in June. As many as three dozen have been obtained in an hour by blowing on tree-trunks (Marsden); they are also sometimes to be taken in great abundance flying round the apple-trees at dusk, in June; also on the tree-trunks and adjacent fences by day.

The imagines of *Eupithecia helveticaria* are to be beaten in June, the larvæ beaten from juniper in early September.

The imagines of *Eupithecia subumbrata* may be freely beaten from yewtrees on all the Kent and Surrey downs (and possibly elsewhere) during June; frequently accompanied by *E. satyrata*.

Pterophorides.—The pupæ of about one-half the British species of plumes can be obtained during this month, attached like butterfly pupæ, by their anal segments to their respective food-plants—*Platyptilia pallidactyla* on yarrow, *P. ochrodactyla* on tansy, *Mimaeseoptilus plagiodactylus* on scabious, *Leioptilus tephradactylus* and *L. osteodactylus* on golden-rod, *Aciptilia galactodactyla* on burdock, *A. spilodactyla* on *Marrubium*, &c.

During the first and second weeks in June the first brood of *Agdistis bennetii* is to be found on salt-marshes where *Statice limonium* grows. The imagines cannot be taken much before eight in the evening.

Wherever *Marrubium vulgare* occurs in the Isle of Wight, there, it appears, in June and July, is the larva of *Aciptilia spilodactyla*, whilst the imagines may be readily disturbed from the plants and surrounding herbage in late July and early August.

Sesiides.—The imagines of *Sesia formiciformis* fly by day in the sunshine, around the willows in which the larvæ have fed up, and may sometimes be seen crawling over the leaves.

The first week in June is the time for *Sesia sphegiformis*, which assembles freely. It occurs in considerable abundance in Tilgate Forest, Basingstoke, and was so abundant in a Welsh locality—Dolau Cothy, Carmarthenshire—recently, that the larvæ destroyed almost all the alders growing there.

The pupæ of *Sesia musciformis* (*philanthiformis*) should be collected in early June; the best situations are the detached rocks at the base of cliffs; it is of no use searching among the luxuriant growth of *Armeria* on the mainland, but the stunted plants scattered in the clefts of water-worn rocks fringing the shore are those attacked; a little red patch on the green cushion betrays the work of the larva (Birchall).

In late June search the stems of poplars near the roots in early morning for freshly-emerged *Trochilium apiforme*.

Zeuzerides.—The imagines of *Macrogaster arundinis* are generally taken at light; much more abundant in Chippenham than in Wicken

Fen; said to emerge from pupa at about 10 p.m., and hence the imago might be obtained when drying its wings, by searching the reeds where it occurs with a lantern at night.

From June 24th to the end of July is the time to search for *Zeuzera pyrina* in the London Parks and elsewhere.

Cochlidides.—The male of *Heterogenea cruciata*, which is nearly black in colour, flies swiftly along the rides of Epping Forest, and is, in my experience, never beaten out (Battershell-Gill).

Kick the stems of young oaks in those parts of a wood free from undergrowth. Then look carefully at everything that falls—*Cochlidion limacodes* ♀ comes down half falling, half flying. The ♂s fly swiftly over the trees in hot sunshine.

Psychides.—"On June 22nd and July 4th (1827) I took a large number of larvæ and pupæ of *Psyche fusca* on the leaves of the hazel and young oaks growing in Hornsey Wood. I have also found them in Highgate Wood" (Ingpen). So many species still exist in these woods that one might almost hope that the case of this insect would again be found.

Anthrocerides.—In early June the imagines of *Adscita statices* are to be found resting on the flowers in the evening in those localities where they fly during the day.

In the first week in June the males of *Adscita geryon* fly among the long grass in the sunshine in hundreds at Dursley, the females hiding among the grass (Griffiths). Same habits elsewhere; also rests on flowers.

The almost barren terraces of limestone in south-western Galway and co. Clare produce *Anthrocera purpuralis* (*minos*) in immense numbers in the middle of June. The pupæ are to be found attached to stones.

At the end of June on the Clare coast, at Black Head, on the horizontal slabs of limestone at the very edge of the cliff, where nothing grows but a few stunted tussocks of grass and the rare *Adiantum capillus-veneris*, *Anthrocera purpuralis* (*nubigena*) occurs in such countless thousands, that when I passed my net along the edge of the cliff it came back full of the moths (Hon. Emily Lawless).

Lachneides.—In June the larvæ of the fine northern form of *Trichiura crataegi* are to be found on the moorlands of Scotland.

During the first week in June the larvæ of *Trichiura crataegi* can be obtained by beating oak.

This is the great month for larvæ of *Malacosoma castrensis* on the Kent, Essex and Suffolk salterns. They are in amazing numbers in certain years on almost all the low marsh plants but are very uncertain in appearance.

In early June a sharp eye should be kept for the larval nests of *Lachneis lanestris* on hawthorn.

Macrothylacia rubi males are best assembled just before dusk; although on the wing all day they rarely assemble until evening.

In early June the larvæ of *Pachygastria trifolii* should be sought on the coast-line between Lydd and Rye, and on the heaths at Lyndhurst.

Lasiocampa var. *callunae* is now on the wing on heaths and moor-

lands; the males can be assembled in large numbers by a newly-emerged female in the afternoon.

The parchment-like cocoons of *Cosmotriche potatoria* are to be easily found by anyone who searches carefully; the sides of ditches are favourite haunts; the position on a rush, grass, or reed, stem varies greatly.

The cocoon of *Eutricha quercifolia* (easily seen when hedges are leafless in winter) is spun up in the bottom of a hedge among the thick shoots in such a way as almost to defy detection when the foliage is on the bushes.

Sphingides.—In early June *Choerocampa porcellus* and *C. elpenor* are abundant at and after dusk over flowers, whilst *Macroglossa fuciformis* and *M. bombyliformis* are abundant by day; the three first-named are very partial to rhododendrons, the last-named to *Ajuga reptans*.

The eggs of *Macroglossa fuciformis* are not difficult to find on honeysuckle (underside of leaf) and those of *Macroglossa bombyliformis* on scabious. When the larvæ have hatched, those of the former species may be beaten or found by searching, those of the latter must be searched for carefully, as they manage to hide very successfully beneath the leaves.

Deltoides.—The imago of *Hypena rostralis* has been bred from a bright green, half-looping larva, found feeding on wild hop in Hackney marshes about the middle of June (Machin).

Lymantriides.—The larvæ of *Leucoma salicis* are exceedingly abundant in June in their special haunts, resting on the poplar stems by day, where they are easily detected; they pupate in spun leaves on their food-plants in July; also abundant in some localities on willow.

Throughout June the northern moors should be searched for cocoons of *Dasychira fascelina* spun up among the heather.

Imagines of *Dasychira pudibunda* are sometimes abundant at rest on the hop-poles in a hop-garden in the morning; the larvæ feed on hop, and are known locally as "hop-dogs." The larvæ of *Orgyia antiqua* are known as "hop-cats."

Webs of *Porthesia chrysorrhoea* should be searched for in early June on hawthorn. The insect is very uncertain in appearance, and is now again abundant in Kent, Essex, &c., after the species has been practically absent from these districts for nearly 20 years.

Nycteolides (Chloephorides).—Full-fed larvæ of *Hylophila bicolorana* are frequently found crawling over oak-trunks early in June; also to be beaten from oak-trees.

Notodontides.—During the first week in June beat low elm-trees on the outskirts of woods, or on the borders of rides in woods. Large numbers of larvæ of *Asteroscopus sphinx* may thus be obtained. The larvæ require plenty of room in which to pupate; they go deep, and unless only one or two are kept in the same pot are likely to disturb one another.

June is a great month for the eggs of Notodonts. Most of the species have pale-coloured eggs, and lay them scattered on the undersides of the leaves of their respective food-plants.

The dark-coloured eggs of *Cerura furcula* are laid in twos and threes

on the uppersurface of leaves of sallow and willow; those of *C. bifida* on the uppersurface of leaves of poplar; and those of *C. vinula* on those of willows, poplars, or sallows; they may be found with a little patient searching.

Spun-up leaves of poplar and sallow should now be overhauled for cocoons of *Clostera curtula*.

Trunks of beech-trees and those of other trees near beeches should be well searched for imagines of *Stauropus fagi*; they do not always select large stems on which to rest.

Assembling in June with a virgin ♀ of *Stauropus fagi* sometimes gives good sport, the time of flight being from a little before 11 p.m. till a little after midnight (for details see *Ent. Rec.*, i., p. 67).

Noctuides.—Moths may not only be found upon or below the sugar, but a foot or two above, or on the other side of the tree, or hanging on the twigs nearest to the sugar.

In June the flowers of *Cotoneaster microphylla* are very attractive to Noctuid moths.

The young larva of *Apatela aceris* sits curled beneath a leaf of horse-chestnut, sycamore, or maple, and eats the lower parenchyma between the veins. In its second stadium it coils itself in a circle and still leaves the veins and upper cuticle, and it is not till it is in the third stadium that it eats the whole thickness of the leaf.

The eggs of *Acronicta leporina*, though laid separately, are usually placed to the number of a score or thereabouts in close proximity; consequently, when young, the larvæ are usually to be found, several near together, on adjacent leaves or branches, so that one being found, others should be searched for. The young larvæ invariably select the underside of a leaf to rest on, and, in feeding, leave the veins and upper cuticle, but when older they eat through the whole thickness of the leaf.

Moma orion comes to sugar at late dusk, from 9 p.m.-9.20 p.m., during the first fortnight in June, and settles, with wings closed, at the top of a patch, looking remarkably like the green lichen, which, in the New Forest, covers the trees.

In June the eggs of *Moma orion* are laid beneath an oak-leaf in batches of fifty or more, regularly disposed in close order like those of many Noctuids.

The young larvæ of *Moma orion*, in the first and second stadia, eat the lower side of the leaves of oak, leaving the upper cuticle and veins untouched, so that a leaf often presents a very perfect skeleton, but with the upper cuticle intact (Chapman).

In pairing *Jocheaera alni* in confinement the ♀ should be kept for two nights regularly fed before the ♂ is put into the cage; the result is then more favourable, and, if the object be to obtain a brood, the sacrifice of a few specimens must be made cheerfully; warm nights and patience are two conditions necessary for success (Smith).

In June, shaking marram-grass which hangs over a bank on coast sand-hills often gives a supply of *Leucania littoralis* and *Mamestra albicolon*. In July and August, *Agrotis tritici*, *A. cursoria*, and *Actebia praecox* may be obtained in the same way.

Imagines of *Agrotis ripae* have been found in abundance under pieces of wood lying on the sand by the seashore, just above the reach of high tide, in June.

From June 7th-20th is about the best time to work for *Hydrilla palustris*. Most of the examples that have been taken in Britain have been captured at light at Wicken and in the adjacent fens, but York and Carlisle have also produced specimens, so that there is no doubt the insect is widely distributed and only wants working for.

The females of *Chortodes arcuosa* are seldom to be seen on the wing, but may easily be found at rest on *Aira caespitosa* after dark, in June (Porritt).

Chortodes morrisii (*bondii*) has been bred from larvæ found in June feeding in the tussocks of *Arrhenatherum avenaceum*. The sickly-looking stems break off close to the roots when gently pulled, and usually below them a larva or pupa is to be found.

In early June the imago of *Dianthoecia caesia* is to be obtained flying over the newly-opened flowers of *Silene maritima*, whilst the larva is to be found a fortnight later feeding on the flowers of the same plant (and those of *S. inflata*) in the coast districts bordering the Irish Sea.

During the first week in June at Witherslack the little *Phothedes captiuncula* was sunning itself upon the flowers of the oxeye daisy (Shuttleworth).

The imagines of *Phothedes captiuncula* fly swiftly in the sunshine (2 p.m.-5 p.m.) in June at Whitbarrow, near Bowness; in the middle of July on the Morsden Rocks, near South Shields.

I have to record the capture, by myself and two friends, of over 300 larvæ of *Xylophasia scolopacina* in woods at Hampstead and Highgate, between the 1st and 3rd of June (Lockyer).

Where *Apamea unanimis* occurs search fences, trunks, palings, and low plants about 8 a.m. for the newly-emerged imagines drying their wings.

Apamea ophiogramma is a genuine dusk flyer, about half an hour being the time in which one has to get them; they fly quietly, look very light on the wing, settle on different flowers — *Scrophularia* and nettles for preference—and are very quiet in the net and easy to box (Farren).

The scarcity of thistles, or any suitable blossoms, to sugar on the Freshwater downs necessitates the use of bundles of cut blossom, of which that of *Heracleum sphondylium* is the most attractive; a well-sugared bunch on June 14th, 1892, was a magnificent sight, being almost covered with *Agrotis lunigera* in the grandest condition.

In June and early July *Agrotis simulans* can generally be found in certain parts of Scotland—Forres (and probably elsewhere)—within doors. Norman visited the various rooms and outbuildings just after dark and found the moths fluttering on the inside of the glass windows.

Common white horehound (*Marrubium vulgare*) and black horehound (*Ballota nigra*) sugared on the Freshwater coast are very attractive to Noctuids, especially *Agrotis lucernea* (Hodges).

About June 20th search for larvæ of *Actebia praecox*. They feed on sallow at night, and hide themselves beneath the surface of the sand during daytime, whence they have to be brought out by raking about the roots of the food-plant.

Agrotis agathina larvæ full-fed on ling, June 23rd; imagines found *in copulâ* September 23rd. Other females laid ova on September 13th (Kane).

The larvæ of *Pachnobia hyperborea* are to be found under moss during early June in fir-woods where *Vaccinium myrtillus* grows (Staudinger), but in Scotland the larvæ feed on crowberry and bilberry, preferring the former (Meek).

The imagines of all the Dianthœcias may be obtained freely at and after dusk at flowers of *Silene*, *Lychnis*, &c., and the eggs on the flowerheads of their respective food-plants.

Silene flowers on the west coast of Britain should be worked at dusk in June for *Dianthoecia luteago* var. *barrettii*. [It should be sought at Howth during the first fortnight in June (Birchall).]

About the middle of June (June 15th), in the evening, wet or dry, *Dianthoecia conspersa* will take wing, quick in motion, but not flying far, and dropping soon on the flowers of *Lychnis flos-cuculi* (Armstrong).

Place at the bottom of an old chip hat-box two inches of sand. Collect the seed-capsules of *Silene inflata*, *S. campestris*, &c., and place on the sand. Cover the top of the box with gauze by means of an elastic band. Put in a few fresh capsules occasionally, and you will breed *Dianthoecia conspersa*, *D. carpophaga* and *Eupithecia venosata* (Hall).

During the first fortnight of June the capsules of *Silene maritima* may be collected for larvæ of *Dianthoecia conspersa*. Later in the month those of *Lychnis vespertina* should be collected for *D. carpophaga*, and those of *Silene cucubalus* (also pinks, sweetwilliams, &c., in gardens) for *D. capsincola*. It is better to search by night than by day*.

The larva of *Dyschorista upsilon* is sometimes to be found in the greatest profusion under the loose bark of willows in June.

Imagines of *Hyppa rectilinea* and *Plusia interrogationis* are to be captured when resting on stumps and stones in dull weather, in June and early July.

Early in June search the sallows and willows for spun-up chambers containing the green larvæ of *Cleoceris viminalis*. As soon as these disappear, examine the folded leaves towards the end of the twigs for larvæ of *Tethea retusa*.

When searching for larvæ of *Clostera reclusa*, do not overlook larvæ of *Tethea retusa;* they fold a leaf or two of sallow around them much after the manner of *C. reclusa*, but the larvæ themselves much resemble those of *Cleoceris viminalis*.

Tethea subtusa uses a single poplar-leaf to hide in, turning over one side and fastening it firmly round the edge with silk. *Taeniocampa populeti* invariably uses two leaves, one fastened above the other. The best way to find the latter is to get below the branches of a tree, when the fastened leaves are readily seen, and, in bright weather, the larvæ can often be distinctly seen through. The larva of *Taeniocampa populeti* also feeds between two united aspen (as well as poplar) leaves.

Larvæ of *Tethea subtusa* are to be found in June "in pockets at the edges of the leaves of poplar, made in an almost identically similar manner to those formed by the young larvæ of *Tiliacea citrago*."

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* Mr. Prout remarks of this note :—"*Lychnis* for *D. capsincola*, *Silene* for *D. carpophaga* and *D. cucubali*."

Larvæ of the red form (ab. *rufa*) of *Taeniocampa gracilis* are to be obtained from bog-myrtle in the New Forest in June.

The pupa of *Dicycla oo* is to be obtained at the roots of oak; but the species is most uncertain in its appearance in all the British localities.

The rather delicate cocoons of *Cirrhoedia xerampelina* should be worked for at the roots of ash-trees at the end of the month; the larva, like that of *Hoporina croceago* (at base of oak), remains in cocoon unchanged for some weeks.

Early in June the wych-elm should be beaten for larvæ of *Mellinia* (*Xanthia*) *gilvago*: usually locally abundant.

During the first week in June beat the low elm-trees on the outskirts of woods, or on the borders of rides in woods. Large numbers of larvæ of *Calymnia affinis* may thus be obtained.

The larvæ of *Polia nigrocincta* may be found in June with a lantern at night feeding on *Plantago maritima* and other plants on the coast rocks of the Isle of Man (Porritt).

Larvæ of *Cucullia chamomillae* are nearly full-fed on *Matricaria* at the end of June. Search for them when the morning sun is on the plants.

Mullein plants should be searched in late June for larvæ of *Cucullia verbasci*. The presence of the larvæ is readily shown by the turning back of the rough surface of the undersides of the leaves; the larvæ themselves are conspicuous enough if the leaves be turned over.

In early seasons during the last fortnight of June (and in July) search *Verbascum* well for young larvæ of *Cucullia lychnitis*.

Ballota nigra is most attractive to *Plusia iota*, *P. chrysitis* and *Habrostola urticae*.

The cocoons of *Plusia festucae* want considerable finding when spun up in the broad leaves of grasses, iris, reeds, &c., by ditch-sides, although conspicuous enough when once detected.

Throughout June the northern moors should be searched for cocoons of *Plusia interrogationis* spun up among the heather.

The imagines of *Agrophila trabealis* (*sulphuralis*) occur in June and July, taking short swift flights from one place to another when disturbed. The species is somewhat difficult to discover when at rest, and is not unlike a *Coccinella* in some positions; about 5 p.m. is the most natural time of flight.

In hunting for *Agrophila trabealis* "a switch, for the purpose of brushing the herbage is of great advantage, and, in capturing the moth, the net should be quickly placed over it as soon as one can get within reach" (F. Bond).

About June 10th is the best average date for *Banksia argentula*: at this time it abounds in Chippenham Fen.

The larvæ of *Toxocampa pastinum*, full-fed in early June, are to be obtained by day at the roots of *Vicia cracca*, &c., and by night more abundantly feeding on the same plant; the larvæ sometimes spin up high among the purple vetch, some spin the cocoon to the ground, others make a cocoon in the ground.

In June search in crevices or under the loose bark of willows and poplars for larvæ of *Catocala nupta*.

Arctiides.—During the second week in June larvæ of *Lithosia caniola* and *L. complana* are to be found at Howth (Birchall).

The larvæ of *Lithosia caniola* should be sought during June on the southern and western shores of England and Ireland, feeding on the flowers of *Lotus corniculatus*, &c.

To obtain *Lithosia sororcula* (*aureola*), in early June, beat the outskirts of a wood with a long pole (9ft.-10ft.), on a really hot day, from 5 p.m.-7 p.m. They flutter out gently from oak, maple, blackthorn, ash, &c. (Raynor).

The larvæ of *Lithosia deplana* are in some years very abundant, and may then be beaten commonly from both oak and beech; most of the larvæ obtained in the New Forest are from trees on which there is no lichen (Sellon).

Lithosia mesomella flies freely just at dark; it is possible on a still evening in late June or early July, to net large numbers in a favourable spot, mostly ♂s, hence probably the favourable spot indicates the nearness of a ♀.

In years when *Œnistis quadra* is common the cocoons are to be found in the crevices of the bark of tree-trunks, on palings near trees, &c., at the end of June; sometimes most abundant in the New Forest.

The cocoons of *Setina irrorella* form a slight web, are placed under stones, oyster-, cockle-, or mussel-shells, &c., covered with ground lichen, on the coast just above the tide mark (Merrin). Also in quite inland localities, where the larvæ feed on ground lichens and spin up under stones.

In June *Euthemonia russula* must be walked up among rough herbage. The ♀s are best disturbed in the morning between 9 a.m.-10 a.m.

Papilionides.—During the last week of June search the plants of *Cardamine pratense* and *Sisymbrium officinale* for larvæ of *Euchloë cardamines*.

The gregarious larvæ of *Eugonia polychloros* should be sought on elm, willow, sallow, aspen, &c., the eggs are laid in the spring by hybernated females and the presence of hybernators in April and early May in a locality should lead to a search for larvæ in June.

Thecla pruni affects the privet blossom in Barnwell Wold. The blossoming of the privet is usually a good sign as to the date to obtain this species.

During the first week in June beat low elm-trees on the outskirts of woods, or on the borders of rides in woods. Large numbers of larvæ of *Thecla w-album* may thus be obtained.

During June bushes of blackthorn should be beaten for larvæ of *Zephyrus betulae*; stunted ones are often most prolific.

The larvæ of *Zephyrus quercûs* can sometimes be beaten in large numbers from oak in early June, as also can those of *Thecla w-album* from elm.

At the commencement of June search the underside of primrose and cowslip leaves for the eggs of *Nemeobius lucina*.

JULY.

This period is the heyday of summer, nature at its fullest, and the hands of the lepidopterist more than full; the freshness of the early

spring departed, the solid work of the year to be accomplished—now or never. Late June and early July produce the harvest of the lepidopterist; three-fourths of the more local species of British butterflies are on the wing; the chalkdowns by day, and still more strikingly at early dusk, are alive with insects; sugar frequently pays the diligent collector, and almost all well-known methods of work are productive. As a rule, the lepidopterist is too busy for evening work at flowers, but the rarer Plusias, and, if there have been many immigrants arriving, many of the rarer Sphingids, may be thus taken. Larva-beating, too, is more often neglected now than at any other season of the year, owing to the temptation to hunt the imagines that abound everywhere. The Broads are at their best in the last week of July or in early August—*Lithosia muscerda*, *Leucania brevilinea*, and many other rare species being on the wing, and larvæ of *Nonagria cannae* ready for collecting. In the fens, too (Chippenham, Wicken, &c.), *Macrogaster arundinis* frequently comes to light in amazing numbers, as also *Nascia cilialis* and other rare species—large and small. In riverside marshes, *Leucania obsoleta* of mid-June is replaced by *L. straminea* in early and mid-July, and other good species are fully out; while on the coast sand-hills, choicest and most reliable of all sugaring grounds, a new fauna delights the inland worker. This, too, is the great season in Scotland, where everything, except a few rare spring and autumn species, is huddled into two month's collecting, especially on the hills and higher mountains. Coast work wants experience; many a species is restricted to a small area, here and there, and many exceedingly abundant species in one locality are absent from an apparently similar one, for no obvious reason. There are the local Lithosiids—*L. lutarella* var. *pygmaeola*, at Deal and Sandwich, and *L. caniola*, at Rye, Torquay, Howth, &c.—*Acidalia ochrata* and *Nyctegretes achatinella*, at Deal and St. Osyth, *Agrotis lunigera*, on the coast of the Isle of Wight, Howth, and a few other chosen haunts; while *Agrotis simulans*, at Portland and in various parts of Scotland, offers a peculiar range of distribution. *Agrotis obscura* (*ravida*) is probably more abundant on the outskirts of Wicken Fen and along the reaches of the Humber than elsewhere. We have tried most kinds of localities, but doubt whether anything interests us more at this time of the year than the exhilarating day-work of the chalk-hills, or the excitement of light in the fens. Light in July, when it is paying, is a marvellous tonic to a lepidopterist—a close, warm, cloudy night, when one can feel the excitement of the air, due perhaps to the rolling thunder in the distance. One has to wait for these nights, but when they come you feel that it has been worth while to wait. On such nights *Macrogaster arundinis*, *Eutricha quercifolia*, *Cosmotriche potatoria*, *Malacosoma neustria*, and *Spilosoma fuliginosa* throw themselves at the light, or with a heavy vibration of the wings buzz around you. You must be wary, or you will miss *Schoenobius mucronellus*, *Catoptria expallidana*, *Sericoris fuliginana* and other rare micros that run up and down the front of the lamp, or the *Pharetra albovenosa* that will go to the back of the sheet, while before the light is put on you net the rare Gelechiids and Tortricids, for which the fens are celebrated. Hunting in the forests and large woods for *Limenitis sibylla*, *Apatura iris*, and the larger fritillaries provides excellent sport for the collector pure and simple or the aberration-hunter; and to hunt the marram-grass blossom on a

favourable night on the Deal sand-hills, with a lantern, for Noctuids, and the *Hippophae* stems for *Nola centonalis*, makes a pleasant change to the town lepidopterist. Of the value of rush- and sedge-flowers as an attraction on certain nights, one cannot speak too highly. Skepper states that, during the last fortnight in July, on the low marshy ground near Lowestoft, he went out with a lantern every night, and found the moths swarming from 9-10 p.m.; so much so as to make the rushes (*Juncus effusus*) look full of variously coloured flowers. Hundreds could have been taken every evening, for they sat perfectly still, extracting something from the heads of the rushes, then past flowering, and all one had to do was to make a selection and box what one wanted. The turn-cap lily is reported to be an especial favourite, among garden flowers, of the July moths, attracting many species in great numbers. Quite distinct is the collecting in our great woods, and a visit to the New Forest is not only productive of rare imagines, but of larvæ innumerable, and the lepidopterist who will not beat in July is likely enough to lose *Notodonta trepida*, *Stauropus fagi*, and other equally good insects. July is also a great month for the larvæ of Rhopalocera, Geometrids, and Noctuids; the first-named generally to be obtained by searching, the others by beating. Larvæ of *Papilio machaon* are usually to be obtained in abundance on the fens (Wicken, &c.), those of *Euchloë cardamines*, on the flower- and seed-stalks of various species of *Cruciferae—Cardamine*, *Erysimum*, &c.; *Gonepteryx rhamni*, quite full-fed, in the early part of the month on buckthorn; *Colias edusa* and *C. hyale*, if there has been a late spring or early summer immigration, on leguminous plants; *Euvanessa antiopa*, and *Pyrameis cardui*, also immigrants, the larvæ of the former on willow, the latter on thistles, &c.; *Vanessa io*, gregarious and very conspicuous on nettle; *Pararge egeria* and *P. megaera*, readily swept at night when feeding on grass; *Zephyrus betulae*, full-fed, early in the month on sloe; *Callophrys rubi*, on the flowering-shoots and blossoms of broom, bramble, *Helianthemum vulgare*, &c.; *Nemeobius lucina*, on the undersides of primrose and cowslip leaves, and several Lycænids—*Polyommatus astrarche*, *P. icarus*, *P. bellargus*, *Lycaena arion*, *Cupido minima*, &c., on various *Leguminosae*. Sweeping and beating for Geometrid larvæ always pay—beating, by day and night, and sweeping, as a rule, only by night—for now all the Ennomids—*Ennomos autumnaria*, *E. alniaria* (*tiliaria*), *E. fuscantaria*, &c.—are feeding, whilst *Amphidasys strataria*, *Tephrosia consonaria*, the Zonosomas, &c., are full-fed; in fact, all the autumnal Geometrids with a single generation, as well as those that have an autumnal (as well as vernal) brood, and, in addition, many that feed up now and go over the winter in the pupal stage are, at this time, to be obtained. The larvæ of such species as *Acidalia ornata*, *A. marginepunctata*, *Aspilates ochrearia* (*citraria*), &c., must be swept, whilst collecting the seed-capsules of *Lychnis dioica* gives larvæ of *Emmelesia decolorata* and *Eupithecia venosata* (the latter also on various species of *Silene*); foxglove flowers give *E. pulchellata*, flowers of *Valeriana officinalis*, *E. valerianata*, those of *Melampyrum pratense* give *E. plumbeolata*, of clematis, *E. isogrammata* and *E. coronata*, whilst larch must be beaten for larvæ of *E. lariciata*, Scotch fir for *E. indigata* and *Thera variata*, spruce for *E. pusillata*, oak for *E. dodoneata*, *E. abbreviata* and *Cidaria psittacata*, and *Sisymbrium* must be searched at Tuddenham for larvæ of *Lithostege griseata;* beating, searching, and sweeping for Noctuid

larvæ must also be prosecuted, whilst almost all the Notodonts are now to be obtained. We would insist on larva-beating in July; so many lepidopterists look on August and September as the regular months for this work, and are so busy during July with imagines, that they systematically overlook many species undoubtedly abundant in their districts. If one were to cast aside the net entirely in July and simply collect larvæ one would possibly discover a new fauna in the old haunts, and great rarities would, in many instances, be found common. July, too, is the great month in which to collect the mines of Lithocolletids and Nepticulids in order to obtain the autumnal broods of these interesting superfamilies. In breeding and rearing larvæ it may be well to note that cork is frequently of great service in order to obtain the satisfactory pupation of many species, but when larvæ do thus pupate in cork, be careful to isolate each one as it prepares to bore, otherwise two or more are almost sure to enter the same burrow, and only the last will have any chance of escape. As for imagines, July produces probably more species in the imaginal state than any other month in the year, and not only are Geometrids, Noctuids, and Tortricids, abundant, but Pyralids, Crambids, Pterophorids, Gelechiids, and Coleophorids are also especially numerous.

Adelides.—*Nemotois fasciellus* (*schiffermillerellus*) occurs freely, resting on the flowers of plants growing on the made roads in Chippenham Fen, in the afternoon sun during July and August.

Coleophorides.—The cases of *Coleophora flavaginella* are to be found during July and August on the leaves, flowers, and fruits of *Suaeda maritima*.

Nepticulides.—The larvæ of *Nepticula betulicolella* feed in early July, in small contorted galleries, in birch, filled with brown excrement.

Elachistides.—The larvæ of *Laverna raschkiella* mine the leaves of *Epilobium angustifolium* in July, whilst those of *L. conturbatella* feed in the shoots, drawing them together with a slight web.

During July and August the twisted heads of *Epilobium* should be collected for larvæ of *Laverna fulvescens* (*epilobiella*).

In July the bushes of *Cornus sanguinea* should be searched for mines of the larvæ of *Antispila pfeifferella*.

Gracilariides.—In July the cones of *Gracilaria populetorum* are to be found on birch. The cone occupies an entire leaf, in which the green, rather transparent, larva feeds.

At the end of July the full-fed larvæ of *Gracilaria omissella* blister the leaves of *Artemisia*. The moths usually emerge about three weeks later.

Rolled-up leaves of maple collected in July give larvæ of *Gracilaria semifasciella*.

Glyphipterygides.—At the end of July the larva of *Aechmia dentella* is to be found spinning together, with a slight web, the seed-heads of *Chaerophyllum temulentum*. It feeds on the seeds.

At the end of July the larva of *Tinagma resplendellum* mines in the leaves of alder, making blotches.

Tortricides.—The imagines of *Tortrix transitana* (*diversana*) fly at dusk in July, over the tops of birch- and elm-trees, on the leaves of which the larvæ feed in spring.

The larva of *Peronea cristana* feeds between united hawthorn leaves in July.

In early July the green larvæ of *Peronea caledoniana* feed upon *Myrica gale* (Pears).

The imago of *Ditula semifasciana* flies at dusk in July and August, over the tops of sallow growing in damp and marshy places, it will also come to sugar. The larva feeds in the shoots (and catkins) of sallow in April and May.

In the last week of July, on the banks of the river Bure, I found *Sericoris doubledayana* flying gently among *Lastrea*, *Myrica*, and reeds, in the late afternoon sunshine. It is necessary to look for the moths, so little do they rise above the undergrowth (Meek).

The tops of the shoots of *Euphorbia amygdaloides*, if the central leaves be spun together, should be collected in July; the larva of *Sericoris euphorbiana* lives within, and bores down the stem some distance; the pieces picked off should therefore be of good length.

Sweep the flowering heads of *Daucus carota* in July for the imagines of *Semasia rufillana*.

Stigmonota orobana flies when the sun is setting, and seems quite merry for a few minutes in the low sun's rays (Farren).

During July and early August, *Coccyx nanana* can be obtained by beating spruce-fir in the afternoon, preferably in sunshine.

The last few days of July and the first week in August should be spent in looking over the seed-heads of *Jasione montana*. The reddish larvæ of *Eupoecilia pallidana* feed within.

During the last week in July the berries of *Rhamnus frangula* are sometimes found fastened together with silk. The larvæ of *Eupoecilia ambiguana* clear out the berries after thus spinning them together.

In the beginning of July the larvæ of *Eupoecilia ciliana* may be obtained feeding on the seeds of cowslip; they require cork or rotten wood in which to pupate.

The larvæ of *Eupoecilia atricapitana* feed in July (second-brood) within the growing stems of *Senecio jacobaea*, eating the pith and stopping the growth of the central shoot so that it becomes thickened and covered with a bunch of leaves, whilst the side-shoots grow up past it (Barrett); usually in terminal shoots.

At the end of July collect the seed-heads of the common blue-bell (*Scilla nutans*) for larvæ of *Eupoecilia maculosana*. It is necessary to open the seed-vessels to find them, as the larvæ give no outward indication of their presence.

In July the imagines of *Argyrolepia hartmanniana* may be obtained by brushing plants of *Scabiosa succisa*.

The heads of *Centaurea scabiosa* should be collected in July and August for larvæ of *Catoptria fulvana* and pupæ of *Conchylis alternana* (*gigantana*), very abundant on cliffs near Dover, where pupa-skins of latter are often seen sticking out of the capitula. Keep in very tightly-fitting box, and you will breed plenty of imagines.

The larvæ of *Conchylis stramineana* feed in July, and again in September, at the base of the flower-heads of *Centaurea nigra*, eating the young seeds, and lying curved in the cavity formed, or (if disturbed) retreating into the stem (Barrett).

Imagines of the beautiful *Chrosis rutilana* used to be taken freely, flying by day in July and August, among juniper on the Surrey downs.

The imagines of *Dichrorampha simpliciana* fly by day in July and August, among mugwort (*Artemisia*). The larvæ feed in the roots during the autumn and winter months.

Pyraloides.—Collect heads of *Umbelliferae* for larvæ of *Depressariae*.

During the first and second weeks of July the deep green larvæ of *Depressaria capreolella* are to be found feeding on leaves on the higher shoots of *Pimpinella saxifraga*. Through the plant being usually buried among taller herbage, the larvæ are somewhat difficult to find.

Gelechia boreella and *Hysilophus juniperellus* are to be beaten from junipers in July in Moray (Horne).

The imagines of the rare *Doryphora palustrella* are to be taken when it is just getting quite dark flying over *Sparganium*, &c., in marshy and boggy places; also come to light later; the species occurs in late July and early August.

Crambides.—The males of *Schoenobius mucronellus* are to be taken at light directly after dark in late July and early August. They may also be obtained sparingly by dusking; so taken at Sandwich and Wicken.

Dusking along the reed-beds in marshes is always very productive during July, *Chilo phragmitellus* may thus be captured, frequently in abundance, as the ♂ s assemble to newly-emerged ♀ s; they may also be taken freely, *in cop.*, on the reeds after dark, with a lantern.

Crambus furcatellus occurs on the scanty turf which covers the highest parts of Helvellyn and the adjacent mountains, early in July. Most of our specimens of late years, however, have come from Scotland and Wales.

Ragonot says that the larva of *Crambus alpinellus* is still unknown, the moth flying on dry sandy pasture-lands, where heath, broom, and *Artemisia campestris* grow in July and August. It is not particularly an alpine insect, nor does it specially frequent fir-woods. Occurs on Deal sand-hills, &c.

During the last week in July search should be made for small aborted cones of common spruce-fir and *Abies douglasii*. The aborted cone usually forms one of a bunch of three or four, the others being well developed. These will be found to contain larvæ of *Euzophera* (*Cateremna*) *terebrella*.

During July, August and September, some white web over the mid-rib of elm leaves indicates the presence of the plain green larva of *Rhodophaea formosa*, which feeds openly by day on the upper surface of the leaves, and probably uses the web for shelter only at night.

The chance capture of a specimen of *Homoeosoma sinuella* in early July would always result in the capture of many, if the species were properly worked for; the imagines are most easily disturbed in the late afternoon, when they often fly freely, and continue to do so until dusk.

Pyralides.—The imagines of *Aglossa cuprealis* are common in July and August, in the barns and stables attached to all the farms about Wicken (and probably elsewhere). They sit on the woodwork among swarms of *A. pinguinalis* and *Pyralis farinalis*.

The larvæ of *Agrotera nemoralis* feed on *Carpinus betulus* during July, living in a loosely-spun web on the underside of the leaves.

In July and September the white patches formed by the larvæ of *Botys asinalis* on the dark green leaves of *Rubia peregrina* are very conspicuous.

The full-grown larvæ of *Botys terrealis* live in July on *Solidago virgaurea*, they eat the flowers, often strip the entire spike, spinning a slight web among the flowers, out of which they wriggle when disturbed (Newman).

Rivula sericealis is to be disturbed in large numbers in late July from the undergrowth, bushes, &c., in Chippenham Fen, Chattenden, etc.

Searching lichen-covered trunks and fences for *Scopariae* is advisable; *Scoparia ambigualis*, *S. cembrae*, *S. mercurella*, *S. crataegella*, &c., are almost sure to be thus taken.

Cymatophorides.—The larvæ of *Cymatophora or* and *C. ocularis* are now to be obtained feeding betweeen the leaves of poplar, those of *Asphalia flavicornis* in rolled-up leaves of birch, and of *A. ridens* between united leaves of oak. Although these can be found, sometimes commonly, by beating and searching by day, they are much more readily obtained at night when they have left their day domiciles.

At the end of July on the Culbin sands larvæ of *Asphalia flavicornis* are not uncommon on small birch-trees (Horne).

Geometrides.—The imagines of *Epione apiciaria* used to occur in abundance late at night (11 p.m.-12 p.m.) round sallow-bushes in Wicken, in late July and early August. We have often made up a bag with this species on the way home.

The imagines of *Geometra papilionaria* occur in early July among birch, appearing regularly about 11 p.m., and remaining on the wing till midnight.

At dusk in July work round the edges of big oak-trees for *Phorodesma baiularia*. The species must be bred to get really fine specimens. Can be beaten out of the neighbouring bushes during the day.

Beat furze during the daytime, in the first week of July, for *Nemoria viridata*.

Ellopia prosapiaria may be found commonly in early July just emerged from the pupa, either on the ground at the roots of the pine-trees or on the bark of these about six inches above the ground (Carlier).

After dusk in July the males of *Geometra vernaria* "assemble" freely to the females that are hidden in the clematis bushes. They may occasionally be disturbed during the day when working for *Phibalapteryx tersata*.

The imagines of *Psodos coracina* fly by day in July in the sun, on the grassy slopes of our Scotch mountains at a considerable elevation.

On rough heath-covered ground in Scotland at a moderate elevation, where there is an abundance of bare rocks, *Dasydia obfuscata* is found in July, resting on the lee side of the rocks, and creeping into

the shelter of an overhanging part (for full details see *Ent. Record*, i., p. 70).

In July the imagines of *Fidonia brunneata* (*pinetaria*) are easily disturbed during the day, and fly sometimes quite freely in the afternoon sun, or in the morning if it be dull and warm.

In the middle of July (also in May) the trunks of mountain-ash should be searched for *Venusia cambricaria*.

In its Bristol habitat *Acidalia dilutaria* (*holosericata*) is abundant in the first week in July; it flies early in the evening, and is very feeble on the wing.

The imagines of *Acidalia rusticata* are sometimes to be taken in abundance in early July, sitting on leaves of ivy, pellitory, &c., growing at the foot of the rocks near the sea-shore, or at the foot of old hedges, walls, etc., inland.

Imagines of *Acidalia contiguaria* may be found, sometimes not uncommonly, at rest in the daytime in July, on rocks on the mountains in North Wales, very often a pair a few inches apart, in which case the eggs from the female may be relied on as being fertile (Porritt).

In July *Larentia caesiata* flies off rocks and trunks in clouds as one approaches them in the moorland districts that it most frequents.

The imagines of *Lobophora sexalata* fly swiftly over the tops of sallow-bushes at dusk in July. Sometimes very common at Wicken, Ranworth, Horning, New Forest; it appears also to be very generally distributed in Kent.

The larvæ of *Emmelesia decolorata* are to be obtained by collecting the capsules of *Lychnis dioica* in July.

The imagines of *Anticlea cucullata* (*sinuata*) are to be disturbed from among *Galium* (at Tuddenham and elsewhere) during the daytime in early July; the species is better obtained by searching for larvæ in August and September.

To obtain *Phibalapteryx tersata* by day thrust a stick into the clematis bushes, and churn them gently so that every part of the leafage is disturbed. It is most abundant during the first week in July.

Towards the end of July, at Tuddenham, examine the heads of *Sisymbrium sophia* which are just seeding. Many of the apparent seed-pods will be found to be full-grown larvæ of *Lithostege griseata*.

Scotosia rhamnata and *S. vetulata* fly freely at dusk around clumps of buckthorn in woods, hedgerows, fens, &c., during July.

In July the imagines of *Collix sparsata* (in Askham Bog, Wicken, New Forest, &c.) swarm at early dusk flying about the buckthorn bushes at Wicken with *Scotosia rhamnata*.

Cidaria picata is to be obtained in July by searching tree-trunks in our southern woods, preferably fairly early in the morning.

The larvæ of *Chesias rufata* (*obliquaria*) should be searched for after dark, with a lantern, on broom.

Collect seed-capsules of *Silene* in July for larvæ of *Eupithecia venosata*. Seed-heads (unripe capsules) of *Linaria vulgaris* in July and August contain larvæ of *E. linariata*. Flowers of *Digitalis purpurea* (foxglove) in July contain larvæ of *E. pulchellata*. Flowers of *Valeriana officinalis* succour larvæ of *E. valerianata* also in July. Seed-pods and flowers of *Melampyrum pratense* in July and August produce *E. plumbeolata*.

The larvæ of *Eupithecia venosata* feed during July inside the capsules

of *Silene*, much in the same manner as the Dianthœcias; keep in well-covered flower-pots, with a good supply of sand at bottom.

From solitary flower-heads of foxglove in open spaces in woods, the larvæ of *Eupithecia pulchellata* may be obtained in the spun-up flowers in July.

In July and August, collect seed-heads of *Linaria vulgaris* for larvæ of *Eupithecia linariata*.

Larvæ of *Eupithecia fraxinata* may readily be found on small ash-trees and especially on the young shoots which often spring from near the bases of large trees, at the end of July and beginning of August (Porritt).

The flowers of *Melampyrum pratense* should be collected in July and August for larvæ of *Eupithecia plumbeolata*.

Towards the end of July and early in August the earliest larvæ of *Eupithecia campanulata* are to be obtained by knocking the plants of the nettle-leaved bell-flower (*Campanula trachelium*) against the sides of an open umbrella. The larvæ feed in the seed-capsules. In confinement they will feed upon garden species of *Campanula*. In some localities almost every dry corolla-tube contains one or more larvæ.

The larvæ of *Eupithecia subumbrata* (*scabiosata*) feed on flowers of *Daucus carota* in July. The larvæ of *Spilodes palealis* feed later in heads of the same plant.

The larvæ of *Eupithecia valerianata* (*viminata*) feed on flowers and seeds of *Valeriana officinalis*, usually growing in damp woods and osier beds. They become fullfed from the middle of July until the end of August.

The fullfed larvæ of *Eupithecia lariciata* may be beaten from larch and spruce-fir during July; they pupate in an earthen cocoon.

Pterophorides.—*Aciptilia tetradactyla* and *A. baliodactyla* are abundant among wild thyme and majoram, and can be disturbed by day but fly much more abundantly at dusk. *Marasmarcha phaeodactyla* can also be disturbed freely by day, among *Ononis*, but is much more abundant at dusk. *Eucnemidophorus rhododactylus* is a night flyer, and occurs most freely after dark, when it can be taken with the aid of a lantern flying about rose-bushes.

The pupæ of *Marasmarcha phaeodactyla* can readily be found attached by the anal segment to stems and leaves of *Ononis*.

The pupæ of *Aciptilia spilodactyla* are usually found attached to the upper surface of leaves of *Marrubium vulgare*.

Oidaematophorus lithodactylus rarely flies till after dark; it then sometimes abounds in places where a specimen is quite unobtainable during the day or early evening.

During July the flowers of common centaury (*Erythraea centaurium*) should be gathered for larvæ of *Mimaeseoptilus loewii* (*zophodactylus*).

The second-brood of *Platyptilia gonodactyla* feeds in July and August in a loose web on the underside of the leaves of coltsfoot (*Tussilago farfara*).

Hepialides.—During the first week in July *Hepialus hectus* sometimes swarms for about half-an-hour just before dark, flying swiftly in wood-ridings, &c.; after dark the pairs may be found suspended from grass-culms.

Sesiides.—During the first fortnight of July, visitors to the south-west coast (Lizard, &c.) should look out for *Sesia musciformis* (*philanthiformis*) flying along the flowery earth-walls, and settling on the thyme and seathrift; *S. ichneumoniformis* is also there at the same time. Both fly in the bright sunshine, and prefer the morning sun.

In July sweep *Lotus corniculatus* in the early morning or late afternoon (after 5.30 p.m.) for *Sesia ichneumoniformis*: sometimes very abundant in Folkestone Warren, &c.

Search trunks (near roots) of poplar-trees in July for newly-emerged *Trochilium apiforme*. The moths may often be found in numbers just emerged from about 7.0 a.m.-8.30 a.m., the empty pupa-cases sticking out of the trunks just beside them.

Similarly at the roots of sallows and willows, also often higher up, but on comparatively small stems and shoots, the imagines of *Trochilium crabroniforme* (*bembeciforme*) may be taken.

The flat dark-brown ova *Trochilium crabroniforme* (*bembeciforme*) are to be found on leaves of sallow.

Cochlidides.—The males of *Cochlidion limacodes* fly high up over the oaks at midday, in the hottest sun in July, and require a long-handled net for their capture. The females (and males in dull weather) are best obtained by jarring the small oak-trees growing in wood-clearings, when they tumble to the ground.

Lachneides.—The larvæ of *Malacosoma castrensis* are now to be found fullfed, crawling in the sunshine on the saltings of the Thames and those of the eastern coast; they spin up from about the middle of the month and produce imagines (exceedingly variable) in August. They are abundant on Wakering Marsh, &c., have been observed to feed on *Statice limonium*, *Atriplex portulacoides*, *A. littoralis*, *Artemisia*, and coarse grasses; in confinement they show a marked preference for rose and birch.

The larvæ of *Malacosoma castrensis* can also be reared readily on chrysanthemums; cover a plant with a muslin net, leave the larvæ until they spin up, then clip off the cocoons and put in a breeding-cage (Button).

The nests of *Lachneis lanestris* are now conspicuous objects on whitethorn and blackthorn, and should be collected for experimental purposes, especially with regard to the elucidation of the problem of the lying-over of the pupæ for many successive years.

The cocoon of *Trichiura crataegi* is to be found on the surface of the ground at the base of any of its various foodplants; sometimes also under pieces of bark at base of trunk, &c.

The eggs of *Cosmotriche potatoria* are often laid in irregular batches on grass or reed-culms; sometimes they are laid more regularly round the culm, the white colour and distinct greenish oval rings surrounding them make them unmistakable.

Dimorphides.—Larvæ of *Dimorpha* (*Endromis*) *versicolora*, now large and resembling big birch-catkins sticking from a twig, are to be found in July; when younger they are gregarious, dark-coloured, and likely to be passed over as sawfly larvæ.

At the end of July, on the Culbin sands, larvæ of *Dimorpha* (*Endromis*) *versicolora* are not uncommon on small birch-trees (Horne).

Sphingides.—Towards the end of July examine bed-straw (*Galium*) from 10 p.m. to 12 midnight with a lantern; by this means the larvæ of *Choerocampa porcellus* can often be found in considerable numbers.

In mid-July and on through August, the larvæ of *Macroglossa stellatarum* should be searched for low down on *Galium*.

Larvæ of *Macroglossa fuciformis* may be readily obtained on honeysuckle, nearly or quite full-fed, those of *M. bombyliformis* on scabious, particularly fond of hiding on the underside of leaves.

Simæthides (Choreutides).—The larvæ of *Simaethis scintillulana* are easily to be obtained by searching *Scutellaria galericulata* in July and early August.

Deltoides.—The pale yellow, rather large, globular (slightly oval and indented on upper side) eggs of *Hypena proboscidalis* are laid on nettle (leaves and stems) and do not hatch until March (Merrin).

Nolides.—From the middle to the end of July, at night, not earlier than 10.30 p.m. to early dawn, search with a light, in grassy places on the south-eastern coast, especially if dwarf bushes of sea-buckthorn occur, and you will probably find *Nola centonalis* sitting quietly on the grass or leaves of the buckthorn. They do not fly freely, and require a close search; or they may be readily overlooked, and have been found on the plants of *Hippophae rhamnoides* on the Deal sandhills, also at Folkestone, Hastings, Freshwater, &c.

As soon as it is really dusk, the rare little *Nola albulalis*, like a soft, white, animated snowflake, flies gently about its restricted habitat in north Kent. [Please spare the females.]

Lymantriides.—During July search the grass, heather, &c., in the proper localities for imagines of *Dasychira fascelina*, which are frequently taken *in cop.* by this method.

The batches of fluff-covered eggs of *Porthesia chrysorrhoea* are readily to be found on the twigs of sloe, whitethorn, *Hippophae*, &c., in its selected habitats.

The eggs of *Leucoma salicis* are to be found on poplar-leaves (usually on underside) in batches covered with a salivary-looking material.

Nycteolides (Chloephorides).—The larvæ of *Sarrothripa undulanus* (*revayana*) may be beaten from oak in July.

Notodontides.—The circular, smooth, white, opalescent eggs of *Lophopteryx cucullina* are to be found on maple on the underside of leaves in shady places in woods, from about the 10th to the end of the month; they are generally laid singly, but sometimes in twos or threes (Merrin).

The young larva of *Lophopteryx cucullina* must be searched for from the middle of July, on chalky hillsides sloping to the north, in the densest shade of beech woods, on stunted maple bushes, and often within a few inches of the ground. A likely bush for the larva may be known by the blotches on the leaves, caused by the larva having eaten, when young, the under-surface of the leaf (Bernard-Smith).

The eggs of *Leiocampa dictaea* are distributed on poplar, sallow and willow; those of *L. dictaeoides* on birch.

Notodont larvæ should now be beaten (most lepidopterists wait for August and lose many)—*Pterostoma palpina* on willow, *Lophopteryx camelina* on oak, beech, &c., *L. cucullina* on maple and sycamore, *L. carmelita* on birch, *Leiocampa dictaeoides* on birch, *L. dictaea* on willow, &c., *Notodonta dromedarius* on birch, hazel, &c., *Drymonia chaonia* and *D. trimacula* (*dodonea*) on oak and birch.

The larvæ of *Notodonta ziczac* may be beaten from sallow, aspen, and poplar, from July to October.

The larvæ of *Cerura vinula* are usually very abundant on poplar, sallow, and willow, the first week in July, and are readily obtained by searching.

The larvæ of *Clostera reclusa* must be searched for in rolled-up leaves of sallow, willow, &c.

Noctuides.—When sugar fails, as it often does in hot and dry weather, instead of going home empty-handed and grumbling, search by means of a light, flower-heads, grass-stems, rushes, or honey-dewed leaves, when frequently you will realise a rich harvest. My best captures have been so obtained (Tugwell).

The yellow form of the larva of *Acronicta leporina*, on birch, resembles a dead yellow leaf or two, with some spinning attaching them to the living leaf, and the black tufts that often persist in this form resemble bits of grass and other dark chips that are entangled in such vacated lodgings (Chapman).

The green white-haired form of the larva of *Acronicta leporina*, when full-fed and sitting curled-up near the middle of the underside of an unilluminated alder-leaf, is invisible from above, but, looking up, from below, it looks like a gleam of light falling through on a portion of a leaf (Chapman).

Give the full-fed larvæ of *Acronicta leporina* some rotten wood, elder-pith, or cork to burrow in, in order to make their puparia. The pupal stage sometimes lasts over three winters.

During July the larva of *Pharetra alborenosa* is not at all difficult to find by searching the reeds growing in Wicken Fen.

The young larva of *Craniophora ligustri* always rests under a leaf, and, when full-grown, along the central petiole of an ash-leaf, which is its usual food; the tapering of the larva at either extremity makes it readily overlooked.

The larvæ of *Craniophora* (*Acronycta*) *ligustri* are, however, sometimes to be beaten from privet hedges, in July and August.

The larva of *Arctomyscis* var. *myricae* is found on the moors at Rannoch; in Aberdeenshire it frequents the coast, roadsides, hedges of fields, &c., wherever there is an abundance of sorrel and plantain which are its chief food-plants (also feeds on ragwort, bramble, Scotch thistle, &c.).

The larva of *Jocheara alni* is to be found throughout July and August; it is conspicuous, sits on the upperside of a leaf (in wet weather lies under the leaf), is easily seen and readily dislodged; it likes sunshine and mounts to the top of a bush or hedge to enjoy it; the sunny side of a hawthorn-bush is a likely place for it; full-grown larvæ should be provided with elder-stems, or raspberry-canes, ready bored

and dried, to pupate in (for details as to breeding see *Ent. Rec.*, i., pp. 136-137).

The larva of *Jocheaera alni* appears to be of a thirsty habit, and in dry weather cannibalism is apt to show itself; the use of a syringe in the evening before the larvæ begin to feed for the night is obvious; the same habit has been remarked of the larva of *Notodonta trepida* (Smith).

To pupate, the larva of *Moma orion* likes to get under a dead leaf, or some similar object, and make a cocoon of loose material on the surface of the ground; in confinement the larvæ will spin up in sawdust, always near the surface, and often aggregate their cocoons together (Chapman).

The larvæ of *Cuspidia menyanthidis* are to be obtained freely in moorland districts on *Menyanthes*, heath, sallow, *Myrica*, &c.

Dusking along the reed-beds in marshes is always very productive in July; *Calamia phragmitidis*, *Leucania straminea*, &c., are thus to be captured.

During the first week or so in July, after dusking for *Calamia phragmitidis*, which commences to fly systematically between 8.15 p.m. and 8.30 p.m., and *Leucania straminea*, which waits till dark and can always be recognised by its white appearance, I used always to search with a lantern for the paired imagines, which remain from about 10 p.m.-12 p.m. seated on the reed-culms about half-way up, and frequently took large numbers of both species. They often drop into the water and swim well to the nearest reed.

Although *Leucania straminea* is best taken on the wing from 9 p.m. to 10 p.m. from about July 1st-August 1st, a drop of sugar in the centre of a flower of the dwarf thistle, common on the side of the dykes in the marshes, will frequently attract it.

In early July on the north denes at Great Yarmouth, known as the "Marrams," *Leucania littoralis*, *Tapinostola elymi*, and many other species abound at the flowers of *Arundo arenaria* (Harmer).

The imago of *Tapinostola elymi* appears to be confined to the sand-hills of the eastern coast of Britain; it abounds locally among *Elymus arenarius* and marram, from which it may be taken freely by night with a lantern, or shaken therefrom by day in early July.

The larvæ of *Calamia lutosa* feed in roots of *Arundo phragmites*, and should be looked for in early July; pupæ, end of July to middle of August. The larva feeds very deeply in the roots, but, when about to change, leaves the plant and pupates in the soil, two or three inches from the surface. The presence of the larva may be readily detected from the bleached appearance of the plants which have been attacked; the pupa, however, will be much more easily found than the larva, for which I have dug as deeply as a foot, and then not reached it (Gardner).

The larva of *Nonagria sparganii*, which feeds very similarly to that of *N. arundinis* (*typhae*), should be sought in the marshes around Hythe, Deal, Rye, &c., in July and August.

Messrs. Webb and Jeffrey were in search of lepidoptera, in Kent, on a wild gusty day in July, 1878, when they turned their attention to the bored stems of the yellow flag (*Iris pseudacorus*). The result was the addition of *Nonagria sparganii* to the British list. The now familiar green larva was also found in the summer of 1879, in bur-reed

(*Sparganium ramosum*). The insect probably occurs in all the marshes from Deal and Sandwich to Hythe, and beyond.

About the beginning of July, before the healthy reeds overtop the affected ones, look over reed-beds for reeds having the top shoot of the reed yellow and withered. About the end of July a circular scar will be observed well down where the larva of *Nonagria geminipuncta* has gnawed through the reed-stem, except the outer skin, in readiness for the emergence of the imago. Cut low down and keep in water, or empty the pupæ out upon damp flannel.

Coenobia rufa is to be found in late July and early August, but frequents low-lying marshy ground, flies rapidly through the low herbage for an hour or so at dusk, and may afterwards be found at rest on the stems of rushes and grass.

Chortodes arcuosa flies abundantly just after dusk among grass, *Aira caespitosa*, in early July. The ♀s rest on the grass, and must be sought with a lantern.

In sugaring for *Agrotis lunigera* at Freshwater, during July and early August, select plants growing near the edge of the cliffs or among the loose chalk rubble in the crevices on the seaward slopes. The best plants for this purpose are *Onopordum acanthium*, *Carduus acaulis*, long upright stems of *Beta vulgaris*, *Heracleum sphondylium*, &c. Occurs also on the Beer Cliff near Seaton, Portland, Torquay, &c.

During the first three weeks in July *Agrotis simulans* is sometimes abundant at Portland on wild-sage flowers; the latter are very attractive to Noctuids and Geometrids so long as the blossom lasts.

In July and August the females of *Stilbia anomala* are to be found early in the evening, sitting on the flowers of ragwort.

Acosmetia caliginosa flies in the grassy rides of Stubby Copse, Brockenhurst, through July. It is best obtained by gently sweeping a net over the herbage as you walk along by day, and it comes freely to light at night. *Hyria auroraria* occurs at the same place, but flies in the sunshine.

The larva of *Celaena haworthii* is grey, spotted with black, and feeds in the stems of cotton-grass, *Eriophorum*: a small hole is made in the stem, from which the excrement is ejected in profusion; the larva is full-fed at the end of July (Edleston).

The larva of *Hydroecia petasitis* feeds on the subterranean stem of *Petasites vulgaris*, in which it makes long excavations during July. The large plants in a dry situation are the most likely to be affected. The pupæ should be dug up about the third week in August.

During the latter half of July and August, look out for any tall thistles (especially *Carduus palustris*), which show, by the drooping and sickly flower-heads, the effects of the internal ravages of a larva. Cut about the end of August and the pupa of *Gortyna ochracea* (*flavago*) will be obtained.

In late July, the imagines of *Triphaena interjecta* may be found flying over bramble-blossom in the late afternoon (4 p.m.-6 p.m.)

Old walls, by or near the sea-side, should be searched during July and August for the imagines of *Bryophila muralis*: the early morning is perhaps the best time. In Cambridge, similarly, for *B. impar*.

The larvæ of the *Dianthoeciae* can still be collected in the seed-heads of *Lychnis*, *Silene*, sweet-william, and other Caryophyllaceous plants.

Collect during July and August the seed-heads of the white campion for larvæ of *Dianthoecia capsincola*: the larvæ often have their bodies hanging half-way out, and round holes in the capsules denote the affected ones.

In July and early August the larvæ of *Dianthoecia cucubali* are to be taken from the flowers of ragged robin (*Lychnis flos-cuculi*).

The larvæ of *Dianthoecia irregularis* may be swept in July from *Silene otites*. Later in August the fullfed larvæ are best obtained by scratching away, with the fingers, the earth near the roots of the food-plant, as here the larvæ lie hidden during the day.

In July collect the seed-capsules of *Silene inflata* for larvæ of *Dianthoecia conspersa*. Southern collectors would be glad if the Scotch collectors could supply them with more of their forms of this species.

On the south-eastern coast, or wherever the Nottingham catch-fly (*Silene nutans*) grows, the larvæ of *Dianthoecia albimacula* may be found in the evening by searching the plants and then gently beating them into a net. Place larvæ so obtained in a calico bag or bandbox, with a supply of seed-heads, and they will feed on the unripe seed. It is better to collect the pupæ from these receptacles, as often you have other lovers of pupæ confined with them, who will gladly make a meal off them (Tugwell).

Fullfed larvæ of *Dianthoecia caesia* may readily be found in the Isle of Man in the daytime, by turning over the large clumps of *Silene maritima*, which grow over and lie upon the coast rocks during July (Porritt).

Towards the end of July and throughout August the imagines of *Eremobia ochroleuca* are to be found sitting in the centre of a scabious-bloom, or that of *Centaurea scabiosa*, in the afternoon sunshine.

Larvæ of *Panolis piniperda* feed on fir, closely resemble the needles, and are best obtained by beating.

Pupæ of *Hoporina croceago* at the roots of oak, *Taeniocampa populeti* at roots of poplar, *Tethea retusa* and Citrias—*flavago* and *fulvago*—at roots of sallow, *Cirrhoedia xerampelina* at roots of ash, *Tiliacea aurago* at roots of beech, *T. citrago* at roots of lime (often between leaves), *Calymnia diffinis* and *C. affinis* among *débris* at roots of elm or in crannies of bark, holes in trunk, &c., should now be collected.

The imagines of *Dyschorista fissipuncta* sometimes fly in swarms about the higher branches of willows at dusk in July (also come to sugar).

The larvæ of *Xylina semibrunnea* are to be found on willow and ash in July (Croydon and Hackney Marshes) (Machin).

The larva of *Cucullia gnaphalii* is to be found feeding on golden-rod, from the end of July to the end of August. The woods above Sevenoaks and Seal are well-known habitats for this rare species.

During July mullein should be searched for the conspicuous destruction caused to the leaves by the larvæ of *Cucullia verbasci*: the undersides of the leaves must be searched for the larvæ.

The fullfed larvæ of *Anarta myrtilli* may be swept from *Calluna vulgaris* in July and again in September (Newman).

During July search *Ononis arvensis* for the larvæ of *Heliothis peltigera*. They prefer the flowers and green seed-pods.

Towards the end of July the larvæ of *Banksia argentula* can be obtained by shaking the high grass-stems, *Poa annua*, *Poa aquatica*,

Poa pratensis, &c., over a sheet of white paper. (Chippenham Fen is the best-known locality.)

Plusia interrogationis has the habit of resting on birch-stumps in places where the heather has been burned down the previous year, and the females deposit their ova on the young heather growing in such spots. The larvæ may (earlier in the season) be swept off the older heather (McArthur).

The flight of *Plusia interrogationis*, in early July over heather, is very like that of *P. gamma*.

Catocala nupta larvæ, now fullfed, are to be found hiding under the loose pieces of bark of willow and poplar, as well as in the cracks of the bark.

Toxocampa pastinum can readily be disturbed during July wherever its foodplant (*Vicia cracca*) grows in Chippenham Fen, Freshwater, and elsewhere; the plants and surrounding herbage want a complete churning with a stick.

Arctiides.—The eggs of *Arctia villica* are often to be obtained from a variety of plants, always laid in true Arctiid fashion in regular batches, on the underside of the leaves.

Nudaria senex literally swarms in early July in a damp meadow near Clevedon; an evening following a day that has been hot and fine, and on which the dew begins to be deposited on the grass at about 7 p.m., is perfect for them; they commence to fly at this time in scores, the grass and rushes become full of them, fluttering up the rush-stems, and then taking flight for a short time; in half-an-hour or so all are again at rest on the herbage and not a single one on the wing (Mason). We have seen them in hundreds at Wicken and Sandwich crawling up the grass and rushes, then fluttering off, threading their way among the low herbage for about half-an-hour. After that their flight is over, and they rest on the plants, where they may be found by searching with a lantern. They also come freely to light.

In late July and early August the imagines of *Nudaria mundana* can be obtained freely by using a hand-lamp in the "droves" and meadows just outside the fens (Wicken), and netting them as they come within range of the light.

Lithosia var. *molybdeola* is to be taken in July and August on grass stems by searching after dark with a lantern (Collins).

Lithosia lutarella var. *pygmaeola* is best obtained when sitting at rest on the marram grass after dark. On some evenings it comes quite freely to light. Can also be found in very early morning resting on grass, or gently flying, or the males sometimes "assembling" to a newly-emerged female in numbers.

Eulepia cribrum may be obained all through July on the lichen-covered heather, two or three miles out of Ringwood, on the Bournemouth Road. Gently sweep or brush your net over the heather as you walk along, and *E. cribrum* will start up and fly rapidly a short distance. Mark down and stalk it. The imagines may be disturbed all through the day, but early evening is the best time.

Papilionides.—The newly-emerged imagines, progeny of the spring-immigrating broods of *Colias edusa* and *C. hyale*, commence to appear the last week in the month; ♀s enclosed over growing plants of clover

and lucerne and placed in the sun, will give an abundance of ova, producing another brood in October.

Pupæ of *Gonepteryx rhamni* in the middle of the month may be found attached to stems and the petioles of leaves of buckthorn.

The second and third weeks in July usually prove the best time for *Dryas paphia*, *Limenitis sibylla*, *Argynnis adippe*, and *A. aglaia* in the New Forest, but in early seasons they may be quite a fortnight earlier.

The eggs of many species of Rhopalocera may be obtained this month—*Limenitis sibylla* (a most beautiful microscopic object) on honeysuckle; *Apatura iris* on sallow (I have seen a dozen collected in a single morning by watching a female, where larvæ could never be beaten owing to the density of vegetation); *Dryas paphia* on violet, *Plebeius aegon* on *Ornithopus perpusillus*, &c.

Find a privet-bush in full bloom where *Melitaea athalia* and *Thecla w-album* are known to occur; on fine, hot, sunny days, quite at the beginning of the month, you will find the species congregated there.

Cossus-infected trees are a sure trap for Vanessids from July to September—*Eugonia polychloros*, *Euvanessa antiopa*, &c.

Apatura iris is usually fairly on the wing towards the end of the second week of the month; flies lower early in the morning, 9.30 a.m.-10 a.m., and after 3 p.m. also comes down; frequents puddles to drink.

Select an oak (on the outskirts of a wood preferably) where the ends of the broad spreading lower branches come down to within six or seven feet of the ground; with a long-handled net *Zephyrus quercus* may often be captured in numbers. Larvæ should be beaten from such trees in June.

AUGUST.

August is the beginning of the end, but a beginning scarcely noticeable until the heavy dews of the last week are fairly upon us. The first fortnight of the month is, perhaps, the busiest of the year in many districts, whilst the last fortnight may, in exceptionally inclement seasons, represent the close of active collecting in the more exposed mountainous districts of Scotland; but, after all, there is still much sport to be obtained in the first fortnight of the month in the Highlands, and, of various forms of sport, none, perhaps, is more exhilarating than rock-hunting. Massive boulders on the moors are the resting-places of certain species of Geometrids, which collect in amazing numbers, a dozen *Dasydia obfuscata*, perhaps, on a single boulder, and the upright cliffs on a mountain-side over which a waterfall bounds from the higher levels, afford, just out of reach of the rushing water and spray, a marvellous haunt for *Cidaria immanata*, *Larentia salicata* and other interesting species, whilst the trunks in a large pine-wood will sometimes be alive with the slowly undulating wings of the former species, which fly off at one's approach. The Norfolk Broads are at their best during the last week of July and the first week of August, but light must be used for the rarities—*Leucania brevilinea*, *Lithosia muscerda*, &c.—or disappointment is sure to follow. In other districts, notably the woods of Kent, the Fens, &c., it is an off season and the Kentish collector wends his way to the chalk-hills and rough waste pastures, whilst the Cambridge collector chooses the flowery

downs of Tuddenham and Brandon, rather than fenland, for his treasures, but towards the middle of August a great change takes place; in the fens the second-broods of many species appear—*Papilio machaon*, *Pharetra alborenosa*, &c., whilst *Tapinostola hellmanni*, *Helotropha leucostigma*, *Noctua umbrosa*, &c., abound, and one is busy enough. But the coast districts are still most attractive at the commencement of the month. On the Lancashire and Kent (and almost all other suitable) coast lines, thousands of Agrotids swarm on sugar—*Agrotis cursoria*, *A. tritici*, *A. nigricans* and *A. vestigialis*, in boundless profusion and variation, afford material for careful study—whilst, now, if ever, the autumnal Coliads and Vanessids will provide the sportsman with excitement. We know a little, not much though, about the migratory habits of *Colias edusa*, *C. hyale*, *Pontia daplidice*, *Argynnis lathonia* and *Euvanessa antiopa*. Possibly, at this season of the year, nothing is more attractive than waving heads of *Eupatorium cannabinum* in full flower, especially in the evening, when a little thin sugar, carefully sprinkled on the flowers, will attract Lithosiids, Geometrids and Noctuids, sometimes in abundance, whilst *Tritoma uvaria* is, by many, awarded quite the first place as a plant to be grown for attracting the August (and September) species—many Noctuids and Geometrids being quite stupefied and easily boxed. Speaking of beds of *Eupatorium* reminds one, too, that this is a favourite resting-place of *Callimorpha hera*, the imagines of which appear, during the first half of this month, the species being generally distributed now over a considerable part of Devonshire. Both in Scotland and at Howth, and possibly in many other districts, the flowers of ragwort are the most enticing means of capturing Noctuids during this month, many Geometrids also being attracted. Flowers of *Calluna vulgaris* and over-ripe blackberries, rather late in the month, have also a good reputation. Many partially double-brooded Geometrids appear in August, the more or less complete character of the brood being determined by favourable or unfavourable meteorological conditions, whilst regularly double-brooded species, *i.e.*, those that produce a second-brood, it would appear almost independently of weather conditions, are also now on the wing. Among others, the Drepanulids—*falcataria*, *binaria*, *cultraria* (*unguicula*)—are partially double-brooded, as also the Notodonts—*camelina*, *dictaea*, *dromedarius*, *ziczac*, &c.—in favourable seasons. But August always appears to us to be the important Noctuid season, due in great part, undoubtedly, to the fact that we have worked more regularly and systematically through this month than any other over a long series of years. At the beginning of the month the Agrotids, Triphænids, Noctuids and Plusiids are among the most abundant, whilst towards the end of the month the Catocalids, Xanthiids (and their allies), *Aporophyla australis*, *Epunda lutulenta*, *E. nigra*, *E. lichenea*, *Xylina conformis*, &c., are accounted among the good things to work for, and *Leucania albipuncta* and *L. vitellina* usually put in an appearance before the end of the month. A good night with *Tapinostola hellmanni* and *Holotropha leucostigma* on Wicken Fen is not to be despised in mid-August, nor a night on the Broads at the commencement of the month with *Leucania brevilinea*. Harding considers that, for collecting at sugar, the wind should be south or south-west, dark, light rain, slight breeze, and the result will be good, but if one point to east or north no good; north-west, if any wind, no good, if calm a little may be done; south or west, still and warm are breeding nights, sugar

little or no good; north or east, with a light wind, little good, with a strong wind, no good. No time is good just before rain, but sultry weather just before a thunderstorm is good, but not after; in general, entomologise after rain but not before. August, too, is a moderately good month for the Crambids, whilst many Tortricids are almost restricted to a few weeks at this time of the year, the genus *Peronea* providing a large percentage of specimens—*sponsana*, *schalleriana*, *comparana*, *caledoniana*, *cristana*, *hastiana*, *maccana*, *ferrugana*, *shepherdana*, &c. The Depressarias and Gelechias, too, are quite among the strongest groups so far as the number of imagines is concerned, and Lithocolletids and Nepticulids are almost as numerous as in June, second-broods of almost all the species being obtainable, whilst Pterophorids are still fairly numerous. Flower-beds, planted out in spring and early summer, will now yield their reward, and plants of honeysuckle still in bloom should be carefully worked for Sphingids and Plusias. Possibly petunias and *Nicotiana affinis* share first place for *Sphinx convolvuli*, *Deilephila livornica* and *Choerocampa celerio*, all our autumnal specimens of which are British-born, but from alien immigrants of the early part of the year. Gas-lamps are a fruitful source of specimens in some seasons, but the work wants a great deal of skill to produce really successful results, so many details being necessary not to miss the best-hidden species. Larva-beating is, in August, usually most productive, and the species to be obtained are so numerous, and the likely localities so diverse, that no one can fail to be successful. Keeping to a special kind of tree is much more useful than promiscuous beating, and if one will pay sole attention to elm for a time, then to oak, then to sallow, &c., and keep the victims from each separate, the result cannot fail to give satisfaction to the collector. The small willows that fringe the sides of ditches, streams, railway banks, &c., should be carefully searched for larvæ of *Smerinthus ocellatus*, *S. populi*, *Cerura vinula*, *Pterostoma palpina*, *Notodonta ziczac*, *Earias chlorana*, &c., before being beaten, the larger larvæ being easily injured, and larvæ of *Acherontia atropos* are to be enquired after before the end of the month. Pupa-digging may also be carried on with a certainty of success, and Norgate describes a novel and ingenious mode by which larvæ can be trapped and pupæ secured where suitable trees exist in one's grounds. Fasten a band round the trunk below the boughs, the band to be made of rough cork or oak bark, also a second band below the cork, the band to be made of sacking, its lower edge fastened lightly to the trunk, its upper edge separated from the trunk by a galvanised wire which has been first twisted (round a ruler) into a spiral form, and fastened round the trunk by hooking its ends together. The sacking-band may then be filled with earth or cocoa-nut fibre for descending larvæ to pupate in. Poplar is a specially good tree. The chief difficulty is to find all the pupæ, as the cork is so easy to penetrate that the borings of the larvæ are scarcely visible. In August, too, one can commence to collect the seed-heads of gentian, *Pimpinella saxifraga*, wild carrot, &c., which should be placed in a flower-pot, and exposed all winter; in July next year you will probably breed *Semasia rufillana*, *Œcophora flavimaculella* and *Asychna profugella* therefrom. Tugwell advises the lepidopterist to search low plants by the sides of marsh-ditches during August for larvæ of *Spilosoma urticae*, fond of sunning themselves; willow-herb and water-bedstraw for larvæ of *Choerocampa*

elpenor, and white or yellow bedstraw on dry banks, sandhills, &c., for larvæ of *C. porcellus* and *Macroglossa stellatarum*, whilst if in woods you notice the leaves of honeysuckle eaten on the low trailing branches, turn them over for larvæ of *M. fuciformis*.

Tineides.—During August and September the seed-heads of *Artemisia absinthium* should be collected and tied up in a linen bag. In this way the larva of *Tinea ferruginella* was discovered clearing out the seeds from the dried flower-heads (Bignell).

Adelides.—The larva of *Nemotois scabiosellus* lives singly in the heads of *Scabiosa arvensis* and *S. columbaria*; later, in September, when the heads are falling, it makes a broad case in which it winters, remaining on the ground or on the lower leaves.

The larva of *Nemotois minimellus* lives in the heads of *Scabiosa succisa*, and, in late autumn, makes a case (from the old florets) in which it winters, remaining either on the ground or on the radical leaves. The case is contracted medially at the edges, and is dark brown in colour.

Nepticulides.—In August and September the larva of *Nepticula woolhopiella* mines in birch leaves. This species was successfully bred by supplying the larvæ with earth and keeping them out-of-doors all the winter.

The larvæ of *Nepticula minusculella* may be bred from pear leaves collected in August.

Elachistides.—The larva of *Chauliodus chaerophyllellus* makes large brown blotches on the leaves of *Heracleum sphondylium* during the summer and autumn months.

In August, larvæ of *Asychna terminella* mine in the leaves of *Circaea lutetiana*, in dark places in woods (Threlfall).

The second week in August is the best time to collect the galls made on the stems of *Polygonum aviculare* by larvæ of *Asychna aeratella*. These should be exposed to direct rays of sun.

About the middle of August search the upright stem of *Epilobium montanum* and *E. palustre* for a swelling near or at one of the joints. Within it the pupa of *Laverna decorella* is to be found.

Argyresthiides.—The larvæ of *Argyresthia aerariella* feed in the berries of mountain-ash, in August.

Lithocolletides.—The long mines of *Lithocolletis frolichiella* are to be found in the underside of alder leaves, sometimes as many as four mines in one leaf.

Lyonetiides.—The larva of *Lyonetia clerckella* feeds on apple, pear, hawthorn, mountain-ash, birch, sallow (*Salix caprea*) and *Cotoneaster affinis* (Fletcher).

Lyonetia padifoliella occurred at Worthing in some plenty in 1893, feeding on apple, *Cotoneaster affinis* and *Prunus japonica* (*sinensis*) in August-September. On apple, the larvæ patronised the topmost leaves of the shoots of the year. The lepidopterist, therefore, should not summer-prune his apple-bushes (Fletcher).

The larvæ of *Phyllocnistis suffusella* are to be found mining leaves of poplar in August. The mine gives the leaf the singular appearance of a snail having crawled over it.

The larvæ of *Cemiostoma lathyrifoliella* are to be found mining leaves of *Lathyrus sylvestris* in August.

Gracilariides.—In August the cones of *Gracilaria phasianipennella* should be collected on *Polygonum hydropiper*; they produce imagines in September.

Plutellides.—The beautiful *Cerostoma sequella* may be found in August, at rest on trunks of ash and beaten from the foliage; it is very local. Also comes to sugar.

Coleophorides.—In August and September, the cases of *Coleophora wilkinsonella*, *C. limosipennella* and *C. paripennella* are to be found on birch. The larvæ hybernate full-fed, but pupate next year without further feeding.

The cases of *Coleophora adjunctella* are to be found during August and September, in salt-marshes, on the seed-heads of *Juncus gerardi*.

The larvæ of *Coleophora inflatella* feed on the seeds of *Silene inflata*, in August, and appear to prefer the dry seed-heads to the unripe pods. Common in the lanes about Croydon.

The larvæ of *Goniodoma limoniella* are to be swept from flowers of *Statice limonium* in September, when they use an empty flower for a case. When full-fed they bore into the stem, dropping the flower, and close the hole with silk. The larvæ hybernate in the boring, and, in May, the old stems of *S. limonium* should be collected for them; they pupate in June and the imagines emerge in July (Fletcher).

Tortricides.—In the middle of August collect the twisted sallow- and willow-tops for larvæ of *Peronea hastiana*: the terminal leaves are preferred, but are not the only ones selected. Enclose in a bandbox and the imagines will appear without further trouble.

Twisted leaves of *Viburnum lantana* and *V. opulus* should be collected at the end of August for the larvæ of *Peronea tristana*.

In early August *Paedisca occultana* haunts Scotch fir, swarming sometimes, and flying off in great numbers from the twigs on which they rest and which they much resemble in colour. This date is rather late for the south of England.

The imagines of *Paedisca semifuscana* fly at dusk among sallows in August and September. The larvæ are to be obtained in May feeding on terminal shoots of sallow.

The imagines of *Paedisca sordidana* are to be obtained in August and September, in damp places among alder and *Myrica gale*. The larva is reputed to feed on both these plants in the early part of the summer.

In the beginning of August the full-fed larvæ of *Sericoris euphorbiana* are to be found feeding in the shoots of sea-spurge, which are drawn together, the larvæ then eating out the hearts of the shoots.

In August the stems of *Stachys palustris* (occurring in marshes and fens) should be collected for larvæ of *Antithesia carbonana*.

Rolled-up sallow and willow leaves will give larvæ of *Phoxopteryx biarcuana*, *P. diminutana*, *Grapholitha campoliliana*, *Phloeodes crenana*, &c.

The larva of *Grapholitha microgrammana* is to be found in August and September, in the still green seed-pods of *Ononis spinosa*.

The pods of *Astragalus glycyphyllos* should be collected in August for larvæ of *Stigmonota pallifrontana*.

The flower-heads of *Knautia arvensis* should be collected in August for larvæ of *Eupoecilia flaviciliana*.

In August and September the larvæ of *Eupoecilia degreyana* feed in the seed-pods on the unripe seeds of *Linaria vulgaris*.

Seed-heads of cowslips should be collected in August for larvæ of *Eupoecilia ciliana*. The larvæ want cork in which to pupate.

During August (sometimes as late as September) the seed-heads of *Picris hieracioides* should be collected for larvæ of *Eupoecilia hybridellana* (Barrett).

Pyraloides.—The larvæ of *Teleia scriptella* fold the leaves of maple in August.

In early August, *Doryphora palustrella* flies directly after dusk, *i.e.*, when it is actually getting dark, and may be then taken flying over the reeds, *Sparganium*, *Typha*, *Iris*, and other plants that go to make up a veritable ditch flora. Later on it comes to light. We have taken it from 10.30 p.m. to 12.30 p.m. by this means.

The larvæ of *Teleia triparella* feed between united oak-leaves at the end of August. They are not uncommon on scrubby oak-bushes, in lanes near Wanstead.

Orthotelia sparganella may be found in early August, where *Sparganium* abounds, but is rather a local species; it flies just at dusk and soon settles on its food-plant.

The turned-down leaves of *Sorbus aucuparia* give larvæ of *Epigraphia steinkellneriana*.

The larva of *Anesychia funerella* is to be found feeding on comfrey at the beginning of August.

Crambides.—In August and September the larvæ of *Homoeosoma binaevella* may be found in the flower- and seed-heads of *Carduus lanceolatus*, forming a large cavity at the base of the flower-head, and feeding on the young seeds.

In August and September the berries of the spindle-tree should be examined for larvæ of *Alispa* (*Nephopteryx*) *angustella*. Frass protrudes from the hole through which the larva enters the berry. A supply of rotten wood for the larva to pupate in is very necessary.

In August and September the larvæ of *Nephopteryx splendidella* feed on the cones of spruce-fir (*Abies excelsa*). The larvæ pupate in rotten wood in September, and emerge the following year.

The larvæ of *Gymnancyla canella* should be collected at the end of August when feeding on the unripe seeds of *Salsola kali*.

Pyralides.—Flower- and seed-heads of *Eupatorium cannabinum* should be collected for larvæ of *Perinephele* (*Botys*) *lancealis*; of *Melampyrum* for larvæ of *Botys fuscalis*; of golden-rod for those of *B. terrealis*; of madder for those of *B. asinalis*, and of wild mustard for those of *Orobena* (*Pionea*) *margaritalis*.

The imagines of *Acentropus niveus* sit on the slimy masses that collect on the surface of stagnant pools in August, and fly over the surface late at night.

In August search the flowers of *Solidago virgaurea* for a Pyralid

larva, living in a slight web. You will probably thus obtain the caterpillar of *Botys terrealis*.

The larva of *Perinephele lancealis* feeds in a web amongst the leaves and flower-heads of *Eupatorium cannabinum* in August and September. When full-fed it spins a cocoon, but does not change to a pupa until the following May.

By poking a haystack (near Martin Mill Station) with a stout stick the first week in August, I disturbed considerably more than a hundred *Pyralis glaucinalis*, which came out two or three at a time and were easily caught.

During August the larvæ of *Orobena* (*Pionea*) *margaritalis* are to be found (often two or three together) under a web among the seed-heads of *Sinapis alba* and *S. arvensis*. They are best found, however, by night, when they are feeding on the seed-pods. Those plants found near growing corn are most frequented.

In August and September the plants of *Teucrium scorodonia* should be well shaken (or beaten) for the larvæ of *Ebulea verbascalis*. The latter should be given sand in which to pupate.

The larvæ of *Spilodes palealis* are to be found at the end of August, feeding on the umbels and flowers of *Daucus carota*.

Cymatophorides.—The larva of *Cymatophora fluctuosa* may be beaten from birch in August and September. It still occurs in Darenth Wood.

United leaves of birch should be collected for larvæ of *Cymatophora duplaris*, of poplars for those of *C. or* and *C. ocularis*.

Geometrides.—Pupæ of the Ennomids should now be collected—*Ennomos tiliaria* among *débris* at roots of oak, birch, &c., *E. fuscantaria* in leaves of ash, &c., *Selenia lunaria* at roots of oak; also *Amphidasys strataria* just below surface at roots of elm and oak. Pupæ of Hybernias—*Hybernia rupicapraria* (oak, blackthorn, &c.), *H. aurantiaria* (birch, &c.), *H. marginaria* (hawthorn, birch), *H. defoliaria* (oak, hazel, &c.), *H. leucophaearia* (oak), also obtained at the same time, in cocoons on, or just below, the surface of the ground.

From the latter end of August onwards, the collector should be on the lookout for the autumn "Thorns," which will often be found at rest on, or flitting round, gas-lamps, and may also be beaten from trees and hedges in the daytime, or found resting on fences.

The pale larvæ of *Hemerophila abruptaria* should now be collected on privet and lilac, usually abundant in suburban gardens where these plants are grown.

The larva of *Phorodesma smaragdaria* should be searched for on *Artemisia maritima* on the marshes at the mouth of the Thames, in August and September (and after hybernation in May). It covers itself with small pieces of its food-plant and is difficult to detect without experience. The larva can be hybernated on common southernwood.

The second-brood (often only very partial) of *Acidalia emutaria* is now on the wing at dusk; in many localities a week or so later *Phibalapteryx lignata* follows it.

Search carefully any suitable rocks, walls, &c. (especially near the sea) for the imagines of *Acidalia marginepunctata* (*promutata*). This

species is on the wing from June to September (most abundant in August and September).

The imagines of *Gnophos obscurata* fly freely at dusk. After dark they settle again, and may then sometimes be taken in large numbers with a lantern.

The seed-heads of *Silene* and *Lychnis* should be collected for larvæ of *Emmelesia affinitata* and *E. alchemillata:* those of yellow-rattle for *E. albulata*.

The larva of *Emmelesia decolorata* may be found in the flowers of campion (*Lychnis dioica*) in August. Its presence is first made known by the half-eaten petals, and it is usually found within the calyx of the unopened flower-bud. Later on it re-enters the seed capsule.

The larva of *Asthena blomeraria* feeds on wych-elm, in or near hilly woods; it remains on the underside of a leaf (Merrin).

Curled-up leaves of alder should give larvæ of *Hypsipetes impluviata*.

The spun-up leaves of *Myrica gale* should be collected for larvæ of *Melanippe hastata*.

The plants of *Galium verum* should be well searched, in August for larvæ of *Anticlea cucullata* (*sinuata*).

At the end of August or beginning of September the larva of *Eucosmia undulata* is to be found feeding in a silken web on the upper-surface of leaves of sallow. As it gets older it spins two or three leaves together.

Oporabia filigrammaria is best collected with a lantern after dark, when the moths can, on favourable nights, from the end of August to the middle of September, be boxed in numbers as they sit paired on the heather-twigs on moors (Porritt).

At the end of August examine the trunks of *Pinus sylvestris* in the afternoon, for the freshly-emerged imagines of *Thera firmata*.

The larvæ of *Cidaria sagittata* feed on the seed-heads of meadow-rue in August, in Burwell Fen and Wicken Fen (and possibly elsewhere).

Towards the end of August the second-brood of *Phibalapteryx vitalbata* may be found amongst its food-plant, *Clematis vitalba:* it is an insect easy to rear, often laying its ova in scores on the setting-board, the perfect insect also frequents flowers of bramble, if any are in the vicinity of its food-plant (Mason).

A ♀ of *Camptogramma fluviata* taken in August or September should be kept for eggs. The larvæ feed up well on knot-grass and dock, and the imagines will emerge in November.

In August and September the larva of *Pelurga comitata* is usually abundant on *Chenopodium*. We used to get immense numbers of this, and the larvæ of *Eupithecia subnotata*, on Greenwich marshes, by shaking the plants at night.

The larvæ of *Collix sparsata* are to be found in August on *Lysimachia vulgaris*.

The flowers of *Solidago virgaurea*, *Eupatorium cannabinum*, *Angelica sylvestris*, and *Scabiosa succisa*, should be beaten into an umbrella, in August, for *Eupitheciae* larvæ.

Flowers should be worked for *Eupitheciae*—toadflax (*Eupithecia linariata*); ragwort, golden-rod, *Angelica*, &c. (*E. centaureata* and *E. castigata*); *Achillea*, *Artemisia* (*E. succenturiata*); campanulas, gentians, &c. (*E. subumbrata*); *Melampyrum pratense* (*E. plumbeolata*); *Campanula*

trachelium, &c. (*E. campanulata*); clematis (*E. coronata* and *E. isogrammata*); scabious and *Calluna* (*E. minutata*); *Calluna* (*E. nanata*); golden-rod (*E. virgaureata*). Searching is perhaps the best method to ensure success, but, where practicable, beating the flower-heads on the sides of an old umbrella is a much quicker method of obtaining a number of larvæ.

Towards the end of August near Queenstown, I beat the flowers of *Senecio jacobæa*, *Angelica sylvestris*, *Solidago virgaurea* and *Eupatorium cannabinum*, growing at the edge of a wood, into a umbrella. On *Senecio* the larvæ of *Eupithecia virgaureata* were much more common than those of *E. absynthiata* which also occurred on the *Eupatorium* together with those of *E. pumilata*, *E. coronata* and *E. castigata*; on the *Angelica* were plenty of small larvæ of *E. albipunctata* (Crewe).

The larvæ of *Eupithecia extensaria* may be beaten from *Artemisia maritima*, at the end of August; they feed freely on this food if planted in pots, and females deposit eggs freely thereon in captivity (Porritt).

In August and September the larvæ of *Eupithecia subnotata* can be obtained, sometimes in great abundance, on *Chenopodium*.

About the middle of August the larvæ of *Eupithecia campanulata* are sometimes to be found freely, feeding in and upon the seed-capsules of *Campanula trachelium*.

In August imagines of *Eupithecia subciliata* are to be taken among maple in woods (Torquay, Bury St. Edmunds, &c.), and are best captured between 10 a.m. and 1 p.m. by beating the trunks and branches of the old trees, when they are easily dislodged, flying off rather quickly (Fox).

At the end of August the larvæ of *Eupithecia fraxinata* may be beaten out of ash.

The larvæ of *Eupithecia helveticata* feed on juniper in August and September.

In August look over the clematis flower-buds; pick off those with a little round hole in them, and pack away in a large flower-pot with earth at bottom; the larvæ will pupate on surface; and hundreds of imagines of *Eupithecia isogrammata* can be bred with little or no trouble.

The larvæ of *Eupithecia satyrata* var. *callunaria* may be obtained in August and September by sweeping the flowers of *Calluna vulgaris*. In August and September the seeds of *Pimpinella saxifraga* should be collected for larvæ of *Eupithecia pimpinellata*.

At the end of August sweep the flowers of *Calluna vulgaris* for the larvæ of *Eupithecia nanata*.

The larvæ of *Eupithecia coronata* feed on the flowers of *Clematis vitalba* and ragwort in August.

Lachneides.—Sembling for males of *Pachygastria trifolii* pays well at dusk with a newly-emerged ♀—Rye coast, Wallasey coast, Lyndhurst, &c.

Dimorphides.—The cocoons of *Dimorpha* (*Endromis*) *versicolora* are now to be found spun-up among the *débris* about the roots of the alder- and birch-trees and bushes on which the larvæ have fed.

Saturniides.—The full-fed larvæ of *Saturnia pavonia* should be

collected in early August; on the heaths they prefer *Calluna* and sallow, but in the fens usually select *Spiraea ulmaria:* larvæ abound in Wicken Fen during the first fortnight of the month.

Sphingides.—The larvæ of *Macroglossa fuciformis* on honeysuckle. and those of *M. bombyliformis* on scabious, are full-fed early in August.

The larvæ of *Choerocampa porcellus* may be found on *Galium;* larvæ of this species and those of *Macroglossa stellatarum* are in some years exceedingly abundant on the stunted plants growing on the shingle or near the sea-shore on the Kent coast, the latter readily found well down in the day, the latter only found at all easily after dark with a lantern.

The sides of ditches are the favourite haunts of *Choerocampa elpenor;* we have found them stretched at length on *Galium palustre*, &c., in the day, basking in the sun, and also, with a lantern, feeding voraciously at night.

On the sea-shore (or near the sea) the larvæ of *Deilephila gallii* feed from the beginning of August till the end of October on *Galium verum* and *G. elatum;* they seem to prefer scrubby plants, are nearly always found in pairs, may be traced from the frass on the sand-hills, and vary much in appearance (Merrin).

After the second week in August look for *Sphinx convolvuli* at flowers of *Nicotiana affinis*, and bedding geraniums; it is on the wing just before dusk, and continues flying for two or three hours.

Sugared bouquets of flowers, consisting chiefly of honeysuckle, geraniums (pale-coloured) and petunias are a most attractive bait to *Sphinx convolvuli;* white and pale-coloured flowers are far more attractive than those of deeper hues (McRae).

The larvæ of the three Smerinthids should now be collected; they are not difficult to find—*Smerinthus ocellatus* on willow and sallow, *S. populi* on poplar, &c., and *S. tiliae* on elm, &c.

Pterophorides.—In early August search the *Stachys* in woods and by hedges for larvæ of *Amblyptilia cosmodactyla* and *A. acanthodactyla.*

The second-brood of *Leioptilus microdactylus* occurs freely among *Eupatorium cannabinum* in early August. They are sometimes on the flowers during the afternoon, but, if not, can easily be disturbed by walking among and shaking the plants, and fly freely towards dusk.

Nycteolides.—During August collect the twisted tops of osiers for the larvæ of *Earias chlorana.* There can be no mistaking the affected heads so conspicuous are the silk-fastened bunches. Enclose securely in a bandbox and they will spin their boat-shaped cocoons without further trouble.

Lymantriides.—During August the larvæ of *Demas coryli* may in some years be beaten in large numbers from oak and beech.

The white spittle-like patches on the underside of willow and poplar leaves cover the eggs of *Leucoma salicis:* the young larvæ hybernate when quite small, and with very little preliminary feeding.

Notodontides.—The Cerurid larvæ are now practically full-fed, and should be beaten or searched for (if practicable), *Cerura bicuspis* on alder, *C. furcula* on sallow and willow, *C. bifida* on poplar; *C. vinula* is a fine object on the upperside of a poplar or willow-leaf.

The larva of *Pterostoma palpina* feeds on poplar and sallow in August and September, and when full-fed forms a rather large silken cocoon usually at the foot of the tree.

Larvæ of *Ptilophora plumigera* buried in a dry sandy soil; after three weeks the pupæ were removed and laid on a perfectly dry surface, with a little moss thrown over them; they were subject to a high temperature during the latter part of summer and autumn, without any moisture whatever, yet all emerged well (Gascoyne).

The larvæ of *Clostera curtula* are to be searched for by day (beaten by night) in spun-up leaves of poplar and sallow.

Noctuides.—I find searching the ragwort shortly after dusk, say from 9 p.m.-10.30 p.m., more productive than any other method for capturing Noctuids at Howth in August (Hart).

The larvæ of *Pharetra albovenosa* are to be found, some years abundantly, on the rough low herbage on Wicken Fen; conspicuous and easily seen.

Nonagria arundinis (*typhae*) is in the pupal state by the end of the month; it should be sought for in stems of *Typha latifolia;* the infested plants may be known by the central leaves being yellow and withered; cut the plant low down, strip off some of the green outside leaves and the outlet from which the moth will emerge will then be seen; shorten the stems, leaving five or six inches above and below the point of exit, insert in wet sand in a deep flower-pot, covering the whole with a piece of muslin; examine every morning or late in the evening, when the imagines will most likely be found clinging to the stems or sides of the pot.

Tapinostola fulva occurs towards middle or end of August in low-lying marshy ground, flying for a short time before dusk and afterwards resting on the stems of rushes and grass.

On August 9th-12th, 1882, forty examples of *Nonagria neurica* were taken at Salhouse (a place a little above Horning), the majority rather worn, so that a few days earlier would evidently have been the proper time (Harmer).

Tapinostola hellmanni, usually supposed to be a purely Fen species, occurs abundantly in Monk's Wood (Hunts) in August. It is much more abundant on the outskirts of Wicken Fen than in the Fen itself.

In August, after dark, the palings and fences around pasture lands and meadows should be searched for the imagines of *Luperina testacea.*

In August cut down the tall thistles that show drooping flower-heads. You will obtain the pupæ of *Gortyna ochracea* (*flavago*). They are also to be found in burdock stems.

Larvæ of *Mamestra albicolon* are now best obtained on sandhills, feed chiefly by night, and appear to prefer *Atriplex*, &c.

Heliophobus hispidus is found at Portland from the beginning of August till early in October, being most abundant during the first half of September; it is generally distributed, but occurs most frequently on some half-dozen steep slopes, covered by long grass, the imagines being found at night sitting on the stems thereof; they are quiet and lethargic, allowing themselves to be boxed off the grass and remaining quietly on the sides of the box.

The globular eggs of *Noctua depuncta* are laid on sorrel and other

low plants, pale, straw-coloured, with a brown micropylar spot and encircled at some distance with brown (Merrin).

Triphaena interjecta is on the wing in August, and may be seen dashing about the sides of hedges as early as four or five o'clock in the afternoon; it comes to lavender flowers at night, is also found at rest on foliage covered with honeydew, and is rather difficult to take on the wing. (All the Triphænas want care in setting, as the wings are apt to split with the setting-needle.)

Agrotis cursoria occurs in August on the ragwort flowers on the extreme edge of the sandhills nearest the sea; the other sandhill Agrotids (*Agrotis vestigialis*, *A. tritici*, *A. nigricans*, *Actebia praecox*, &c.) will be found further inland, where scarcely a specimen of *A. cursoria* will be taken (Porritt).

Agrotis obelisca rarely appears before the end of August; it then comes freely to sugar and is most abundant in early September; it abounds in some years on the Freshwater coast in the Isle of Wight.

In late August and early September the females of *Stilbia anomala* sit on the flowers of ragwort in the early evening (Jäger).

The second week in August is the best time to capture *Agrotis agathina*. "The best plan to capture it is to light the lantern and watch the places among the heather which are partly sheltered with trees. The insect appears to fly for about a quarter of an hour briskly over the heather, after which it settles for half an hour or so, during which time it may be found on the heather bloom; the slightest shake, however, causes it to fall like a stone, when it is usually lost. After this half-hour's rest it flies again, and must be taken with the net and lantern. This period yields by far the greatest number of moths" (G. Norman).

On the sea-coast, beneath the plants of *Atriplex littoralis* and *Salsola kali*, the larvæ of *Agrotis ripae* may be obtained in large numbers, resting, when young, on the stems and leaves of the food-plant, but afterwards tunnelling under the sand, where they hide during the day. They are best obtained from the middle to the end of August, when they are nearly full-grown, and can generally be found simply by passing the fingers through the sand.

The larvæ of *Dianthoeciae*, if not collected the preceding month, should be taken now. A bag full of seed-heads of *Lychnis silene* (from as many localities as possible) should be obtained; at the same time, it must not be forgotten that, whilst some of the species, *e.g.*, *Dianthoecia capsincola*, bury themselves in a large capsule when full-fed, others, *e.g.*, *D. irregularis*, feed by night, and hide by day in a little cavity hollowed just below the surface of the ground.

On the coasts of Devon and Cornwall the capsules of *Silene inflata* and *S. maritima* should be collected in August for larvæ of the dark aberration of *Dianthoecia conspersa*.

In early and middle August the seed-capsules of *Silene maritima*, in the Isle of Man, Ireland and the west coast of Britain, should be shaken and collected for larvæ of *Dianthoecia capsophila* and *D. caesia*.

The dimorphic (green and red forms of the) larvæ of *Hadena pisi* are frequently abundant in August and September on broom, bracken, sallow, &c., and, although they are to be found somewhat freely in the daytime, they may be collected much more commonly after dark.

Hadena pisi feeds also on ling, *Myrica gale* and bracken; *Calocampa vetusta* feeds sometimes on *Myrica gale* (Kane).

During the first fortnight of August, search carefully the seeding-plants of lettuce in gardens. The variable larvæ of *Hecatera dysodea* will be found stretched at full length, during the day, on the blossoms and seed-heads.

The pupæ of Tæniocampids are best obtained now—*Panolis piniperda* at roots of fir-trees, *Taeniocampa gothica*, *T. incerta*, *T. stabilis*, *T. munda*, *T. miniosa*, *T. pulverulenta* at roots of oak, &c., *T. populeti* at roots of poplars, *T. gracilis* at roots of willow, *T. opima* at roots of dwarf sallow.

Pupæ of *Taeniocampa opima* are to be found at roots of dwarf sallow and *Rosa spinosissima;* this species prefers coast sand-hills in some districts, and the pupæ are then found just below the sand.

Pupæ of *Panolis piniperda* are to be found in Scotch and other fir-woods, preferring the margin of, or open places in, these woods; sometimes in crevices of bark, or under moss and fallen needles, rarely within 2ft. of the tree and from one to two inches deep (Merrin).

The imagines of *Tiliacea citrago*, besides coming to light and ivy at the end of August, frequent the leaves and twigs of lime-trees at night (Merrin).

The somewhat fragile cocoon of *Cirrhoedia xerampelina* must be searched for at the roots of ash in August and early September.

Search trunks of ash-trees in late August and throughout September, from 10 a.m. to 3 p.m. (sometimes even till dusk), for the freshly-emerged imagines of *Cirrhoedia xerampelina*. The grass around the trees should also be very carefully worked, also dead leaves around. Detached trees (*i.e.*, those not growing in hedgerows) are the best.

Verbascum plants should be well worked for larvæ of *Cucullia lychnitis*, *Aster tripolium* and golden-rod for *C. asteris* (exceedingly abundant some years on the Thames' salterns), golden-rod for *C. gnaphalii*, and *Artemisia absinthium* for *C. absynthii*.

The larva of *Cucullia umbratica* hides by day near the ground under leaves of *Sonchus*, lettuce, &c.; feeds on the upper leaves and flowers at night (Merrin).

During August, the larvæ of *Cucullia absynthii* may be obtained by beating *Artemisia absinthium*.

Towards the end of August the larvæ of *Cucullia asteris* are frequently very abundant on sea starwort.

In August *Cloantha solidaginis* may be collected from bilberry and heather with the aid of a lantern after dark on northern moors, or in the day-time at rest on walls and pine-trunks in moorland districts (Porritt).

In August the larvæ of *Chariclea umbra* (*Heliothis marginata*) are sometimes abundant on *Ononis*.

The larva of *Anarta myrtilli* should be swept for on heaths (covered with *Calluna*) with a circular net, which is better than beating into an umbrella for this species. August and September are the best months. Does this species still occur on Wimbledon Common (the side near the park)?

The cocoons of *Catocala nupta* are spun-up among the leaves, in crevices of bark, or under loose bark, of willows and poplars.

The larvæ of *Erastria fasciana* (*fuscula*) may be found feeding at night about half-way up the culms of *Molinia caerulea* (Merrin).

Larvæ of *Euclidia mi* occur on sandhills feeding on the marram-grass; they drop off when disturbed and twist into grotesque attitudes and feign death; the white mottled colour and shape exactly imitate the exuviæ of snails (*Helix nemoralis*) (Kane).

Arctiides.—The low plants growing along the sides of marshy ditches should be carefully searched during August and September for larvæ of *Spilosoma urticae*.

The imagines of *Lithosia caniola* fly at dusk; come to sugar at dawn, and the males may be attracted by a newly-emerged female.

Imagines of *Lithosia griseola* and var. *stramineola* frequently come freely to sugar in July and August in the fens.

SEPTEMBER.

September, dependent upon meteorological conditions, may be, and sometimes is, one of the most interesting months to the field lepidopterist. The downs and clover-fields may be alive with *Colias edusa* and *C. hyale*, the Vanessids are in their freshest beauty, the pupæ of *Polygonia c-album* are sometimes to be obtained in great numbers from the western hop-gardens, the second-brood of *Polyommatus bellargus* is usually in abundance, and *Argynnis lathonia* and *Lampides boeticus* may possibly be obtained in our southern counties. The late Sphingids are on the wing, and it is *par excellence* the month for *Sphinx convolvuli*, *Deilephila livornica* and *Choerocampa celerio* at beds of *Nicotiana affinis*, petunias, and late flowers of honeysuckle. If *Deiopeia pulchella* immigrants have appeared in May and June their progeny will be now on the wing, and light will repay the diligent worker—*Trichiura crataegi*, *Ennomos autumnaria*, *E. alniaria*, *E. fuscantaria*, *E. erosaria*, *E. quercinaria*, *Himera pennaria*, *Oporabia dilutata*, *Camptogramma fluviata*, *Cidaria psittacata*, *Gortyna ochracea*, *Luperina cespitis*, &c. In the marshes *Nonagria arundinis* (*typhae*) and *Calamia lutosa* often abound, and on waste ground *Hydroecia micacea* (among dock) and *H. petasitis* (among *Petasites*): at sugar our coast districts give us *Aporophyla australis*, *Peridroma saucia*, *P. ypsilon*, *Agrotis obelisca*, and *Actebia praecox*, whilst *Epunda lutulenta*, *E. lichenea*, *Heliophobus hispidus* and *Leucania albipuncta* also appear to be confined to our coasts, and *Euperia paleacea* (*fulvago*), *Mellinia gilvago*, *Trigonophora flammea* (*empyrea*) and *Aplecta occulta* prefer woods, whilst *Calocampa solidaginis*, *Noctua glareosa*, *Agrotis agathina*, *Celaena haworthii*, &c., prefer the heaths and moorlands. But ivy is the attractive sport, although ivy usually carries us well into October, and the fortunate collector who bottles *Dasycampa rubiginea*, *Orrhodia erythrocephala* or *Xylina furcifera*, will perhaps not care for *Orthosia macilenta*, *Anchocelis rufina*, *A. litura*, *Orrhodia vaccinii*, *O. ligula* (*spadicea*), *Calocampa vetusta*, and *C. exoleta*, although he will not despise *Xylina socia* or *X. semibrunnea*. Often when ivy fails altogether these species will abound at sugar, with *Hoporina croceago*, *Tiliacea aurago*, *Polia flavocincta*, whilst *Catocala nupta* often gives variety and excitement to the sugar patches, and *C. fraxini* may always appear. Ripe yew-berries sometimes attract the autumnal moths in large

numbers—*Dasycampa rubiginea*, *Hoporina croceago*, *Orthosia macilenta*, *Anchocelis rufina*, *A. pistacina*, &c., in fact, almost all the ordinary frequenters of ivy-bloom are to be thus obtained. Among the Tortricids the Peroneas are the chief game, although *Paedisca* still provides *ophthalmicana* (aspen), *occultana* (fir), *solandriana* (birch), and *sordidana* (alder), in their special haunts. Of the remaining groups the Depressarias are probably the strongest (most of these hybernate as imagines), whilst Gracilarias are also well represented. There is, also, during this month, a number of species that produce a partial second-brood in favourable seasons, and the larvæ from these, although frequently reared successfully in confinement, must, in an early and cold autumn, undergo annihilation, in nature, if it become necessary for them to reach the pupal stage before hybernation. Where there are ripe plums in autumn one should find some available means of access for night work, for all the moths in the district will feed by night, where flies and wasps feast by day—*Hadena protea*, *Anchocelis pistacina*, *A. litura*, *Tiliacea citrago*, *Citria flavago*, *Luperina testacea*, *Gortyna ochracea*, *Polia flavocincta*, *Mellinia gilvago*, *M. circellaris*, *Miselia oxyacanthae*, &c., are among the moths to be captured. Pupa-digging will always be one of the favourite modes of collecting during autumn, perhaps more so in October than September, when the beating-stick is so busy. So much has been written about the most likely positions, the most likely trees, and the most favourable conditions under which pupæ are to be obtained, that one would suppose that everything that can be learned is already known; all we can say is, that, in practice, the most cherished theories fall to the ground. We have known the solitary tree produce no pupæ, and a tree in a crowded wood give many; we have worked trees in sandy localities without success, and obtained pupæ from trees growing on a clay soil, thus setting all the accepted theories at defiance. One rule alone holds universally, and that is, that the lepidopterist who works hardest, keeps at it longest, tries the most varied methods, and visits the most widely differing localities will score most heavily at the end of the year in the number and variety of species discovered (see *Ent. Record*, xi., p. 51). With regard to keeping pupæ through the winter, we would refer our readers to the notes in *Ent. Record*, i., pp. 263, 264; iii., p. 242; ix., pp. 324-326, and suggest that extreme drought, extreme moisture, mould, and living enemies (chiefly invertebrate) are the greatest opponents of success. Larva-beating is the most universally recognised mode of collecting in September; every active lepidopterist beats for larvæ this month, however much he may neglect it throughout the remainder of the year. Most of the butterfly larvæ now feeding (chiefly Satyrids, Lycænids and Hesperids), as also the Arctiids and the Lachneids are better obtained after hybernation; the Sphingid larvæ (which do not hybernate in this stage) are best obtained now—*Sphinx ligustri*, *S. convolvuli*, *Acherontia atropos*, *Deilephila gallii*, *Macroglossa stellatarum*, &c.—as also the Lymantriids, *Dasychira pudibunda*, *Notolophus gonostigma*, &c.—the Geometrids—*Eurymene dolabraria*, *Selenia tetralunaria*, *Boarmia cinctaria*, Zonosomas, Acidalias, and above all the Eupithecias, the latter alone forming quite an autumn's work in the collection of the various species. Notodontid larvæ, too, are sometimes frequent (especially if double-broods have been usual), as also are those of Drepanulids, Cymatophorids, Acronyctids, and a large number of Noctuids, many of the latter, however, being

usually obtainable after hybernation. Nor must it be forgotten that larva-beating, however well it may pay by day, should be regularly prosecuted by night; birch alone gives a host of good things, and many of the birch-feeding larvæ cling well, *e.g.*, those of *Cerura bicuspis*, *Leiocampa dictaeoides* and *Notodonta dromedarius*; others pass the day in spun-up leaves coming out to feed at night, *e.g.*, *Cymatophora fluctuosa*, *C. duplaris*, *Drepana falcataria*, &c.; these are difficult to obtain during the day but they tumble readily enough into the beating-tray at night when they are feeding. Tortricid larvæ are less frequent during this month unless they be those species obtainable throughout the winter, and, of the smaller lepidoptera, the Nepticulids, the Lithocolletids, the Gracilariids (including *Ornix*) and the later Coleophorids should now be collected. If the collection of mined leaves for Nepticulids and blotched leaves for Lithocolletids be put off till the leaves have dropped, comparatively few will be obtained, especially of the Nepticulids which do not always spin their cocoons on the leaves which they have mined. In late September and early October a visit to the New Forest should produce among others the following larvæ—*Gnophria rubricollis*, *Heterogenea cruciata*, *Apatura iris*, *Demas coryli*, *Lobophora sexalata*, *Eurymene dolabraria*, *Tephrosia extersaria*, *Drepana falcataria*, *Notodonta dromedarius*, *Chloephora prasinana*, *Zonosoma linearia*, *Z. punctaria*, *Acronicta leporina*, *Cleora glabraria*, *C. lichenaria*, *Lithosia deplana* (*helveola*), &c. The flower-heads and seed-heads of many plants should be collected now and tied up in linen bags, *e.g.*, *Solidago*, *Artemisia*, *Senecio*, *Angelica*, &c., whilst flower-heads of *Saponaria officinalis* are reputed to give a good result, as larvæ of many species feed thereon during this month. It is time, too, to commence to beat thatch (of hay, hopbine, reeds, pea-haulm, &c.), for Depressariids and other hybernating species, a mode of work we have already suggested as being advantageous during the whole of the winter.

Lyonetiides.—The larvæ of *Bucculatrix cidarella* are to be found in September on leaves of alder. They spin thin ribbed cocoons on the stem.

Glyphipterygides.—The full-fed larvæ of *Acrolepia autumnitella* are to be obtained in September, in mines that make conspicuous greenish-white blotches in the leaves of *Solanum dulcamara*.

Elachistides.—At the end of September, from a hedge composed principally of dogwood, a large number of nearly full-fed larvæ of *Antispila treitschkiella* was collected; the mined leaves were put in a flower-pot, covered with a glass cylinder, and, as the larvæ cut out their cases, the leaves were removed. The pot was kept exposed to the full influence of the weather till the emergence of the moths in July, when a large number was reared (Machin).

The first fortnight in September is the time for the larva of *Cosmopteryx schmidiella*, which whitens the leaves of *Vicia sepium*.

In September and October the larvæ of *Elachista taeniatella* may be found in the leaves of *Brachypodium sylvaticum*.

Lithocolletides.—Although the work can be done later, mined leaves should be collected this month for Lithocolletids. Mined oak-leaves for *Lithocolletis hortella*, *L. irradiella*, *L. lautella*, *L. querci-*

foliella, *L. heegeriella*, and *L. cramerella*; elm-leaves give *L. tristrigella*, *L. schreberella*; nut-leaves give *L. nicelliella*; alder-leaves give *L. frolichiella*, *L. stettinella*, *L. klemannella*, *L. alnifoliella*; poplar-leaves, *L. comparella*; honeysuckle, *L. trifasciella*, *L. emberizaepennella*; hornbeam-leaves, *L. tenella*, *L. carpinicolella*; osier- and sallow-leaves, *L. viminiella*, *L. spinolella*, *L. viminetella*, *L. salicicolella*, *L. quinqueguttella*; furze, *L. ulicicolella*, &c.

Coleophorides.—During the first week in September the cases of *Coleophora melilotella*, which are very like the dark seeds of *Melilotus*, are to be found on the latter plant.

The best time for collecting the larvæ of *Coleophora fuscocuprella*, is in September and the beginning of October. The larva feeds on nut, and is said to show a preference for the undersides of the little leaves at the termination of a bough.

Thistles in sheltered (and frequently open) situations give, in early September, the cases of *Coleophora therinella*.

Tortricides.—The larvæ of *Tortrix viburniana*, *Grapholitha geminana*, *Phoxopteryx myrtillana*, *Coccyx vacciniana*, &c., may be collected freely from *Vaccinium*.

In early September sallow- and willow-leaves fastened to the stem, or the spun-together terminal leaves, will still often contain larvæ of *Peronea hastiana*.

In September and October, *Peronea lipsiana* and *P. maccana* love to sit for an hour or two in the afternoon sun, before flight, on the upper-sides of bracken leaves and bilberry; *P. rufana* on the leaves of sweet-gale and sallow; *P. mixtana* on heather, &c.

Collect the seed-heads of wild carrot, in September, for larvæ of *Semasia rufillana*.

In September the dirty-whitish-green larvæ of *Penthina postremana* are to be found within the stems of *Impatiens noli-me-tangere*.

The larvæ of *Sericoris euphorbiana* are to be found in the closed heads of *Euphorbia amygdaloides* during the first fortnight of September.

Beech-nuts should be gathered in September and October for larvæ of *Carpocapsa nimbana*. This larva pupates among moss on the trunks of beech-trees.

The larva of *Carpocapsa juliana* feeds on acorns in September, and is full-fed about the time that the acorns fall.

The larva of *Catoptria tripoliana* feeds in the seeds-heads of *Aster tripolium*, and is full-fed towards the end of September.

The larvæ of *Catoptria aemulana* feed in the seed-heads of golden-rod in September and October.

The larvæ of *Phoxopteryx derasana* are easily detected on buckthorn in September by the leaves being folded over and fastened together for the whole extent of the leaf. They remain in the larval state till spring, and then, after wandering about for a day or two, pupate in rough cork.

The larvæ of *Stigmonota weirana* should be searched for in September and October, when they feed between united beech-leaves.

The larvæ of *Stigmonota orobana* are to be found in pods of *Vicia cracca*, *V. sylvatica*, *Genista tinctoria*, and *Orobus tuberosus* (Merrin).

The seed-heads of burdock (*Arctium lappa*) should be collected in

September, for the larvæ of *Argyrolepia badiana*, which pupate among rubbish at the roots of the plant.

The larvæ of *Eupoecilia curvistrigana* should be searched for in September, in flowers of *Solidago virgaurea*, eating out the young seeds and, passing from one flower to another; they spin up finally among rubbish on the surface of the ground; larvæ of *Eupoecilia subroseana*, *E. implicitana* and *Catoptria aemulana* may also be obtained at the same time.

Gather seed-heeds of *Picris hieracioides* for larvæ of *Eupoecilia hybridellana*, also heads of *Daucus carota* for larvæ of *Semasia rufillana*; both these species should have old stems or rubbish in which to pupate, and must be kept all the winter in rain and sun.

Cossides.—Larvæ of *Cossus ligniperda*, large and full-fed, are often found wandering on paths, roadsides, &c. Put a large piece of rough cork in a flower-pot, cover the latter with glass; the larvæ will bore into the cork, make winter cocoons, remain therein without feeding all the winter, pupate the following April or early May, and emerge some three weeks afterwards.

Pyraloides. — In early September the conspicuous white mines made by larvæ of *Nannodia naeviferella* are to be seen in leaves of *Chenopodium*. At the same time, and on the same plant, the less conspicuous mines of *N. hermannella* are also to be found.

In early September the blotched appearance of the leaves of sallow betokens the presence of the larvæ of *Teleia notatella*. On the same plant, and at the same time, the cones of *Gracilaria stigmatella* (or their white, silvery-looking cocoons, on the underside of the leaves) are to be found.

The larva of *Teleia scriptella* is to be found feeding between united maple leaves in the early part of September. The larva changes to a pupa, in a slight silken web in the fold of a leaf, towards the end of the month.

The seed-heads of burdock should be collected in September, for the larvæ of *Parasia lappella*, which pupate in the seed-heads.

Seed-heads of *Daucus carota*, collected in September, sometimes give imagines of *Depressaria depressella* the following month.

The larvæ of *Enicostoma lobella* live in the turned-down leaves of blackthorn in September. Imagines may be beaten in June.

In September the larvæ of *Ptocheuusa inopella* occur in seed-heads of *Inula dysenterica*.

Crambides.—Nests of humble-bees and wasps collected in September and October, will often give large numbers of the larvæ of *Aphomia sociella* (see *Ent. Record*, pp. 288-289).

Examine heads of ragwort, especially near the coast, for a gregarious Tortricid-like larva that feeds therein; if you can bring such through the winter you will probably breed *Homoeosoma nimbella* or *H. senecionis*.

Pyralides.—Larvæ of *Pyrausta punicealis* are to be found during September, feeding on the flower-heads of *Nepeta cataria*, under a confused covering of silken threads. They spin tough cocoons about the middle of October, and pupate irregularly in the spring.

In September the larvæ of *Spilodes palealis* are to be found feeding in the umbels of wild carrot which they draw together with a web. They pupate on the ground, and the cocoons are best kept out-of-doors during the winter (Simmons).

In the middle of September the larva of *Ebulea stachydalis* feeds on the leaves of *Stachys sylvatica*, living in a sort of tube, formed either by turning down the top of a leaf and folding it closely to the under-surface with a quantity of silk, or else by drawing together a fold of the under-surface, and covering it over with a thick silken web, in either case leaving an opening at the end. It comes out at night to feed. The larvæ are usually found low down on the plants, eating large holes through the substance of the leaves, but leaving the margin and veins untouched (Buckler).

During September work among coltsfoot for *Scopula lutealis*, when it is pretty easily disturbed.

Drepanulides.—The larva of *Drepana harpagula* (*sicula*) is to be obtained in Leigh Woods, near Bristol, by beating, in the middle of September.

The larva of *Drepana falcataria* is common in September and October on birch and alder. The work of the larva is conspicuous on *Alnus glutinosa* owing to its bending the sides of the leaves upward with a few silk strands. If not within this tent, it may usually be found on the upperside of some neighbouring leaf.

The larvæ of *Drepana lacertinaria* are now to be found between united birch-leaves, those of *D. binaria* (*hamula*) on oak and those of *D. cultraria* (*unguicula*) on beech; beating by night (or day) or searhing by day will give these in their known haunts.

Geometrides.—The larva of *Pericallia syringaria* hybernates small, and may be found in September and October on honeysuckle, privet and lilac (also in May after hybernation).

In September *Ennomos alniaria* (*tiliaria*) is often very abundant on gas lamps. It flies at dusk, and normally rests on the trees, after dark, in woods, &c.

The ova of *Ennomos fuscantaria* are readily obtained in confinement from a gravid female; in nature the flat eggs are laid along the twigs of privet and ash in short rows. Those of *E. alniaria* (*tiliaria*) are laid on oak, birch, &c.

The pupæ of *Odontopera bidentata* are frequently found under moss on trees of various kinds.

The cocoons of *Hemerophila abruptaria* are to be found by close searching on the twigs or between the forks of privet and lilac, or on fences near where these trees are growing; the species is very common in the London suburban districts.

Larvæ of *Boarmia roboraria* may be sleeved successfully during the winter on birch and will eat the bark of the twigs before the leaves appear. As they sometimes kill the young shoots, early removal in spring to another branch is necessary.

The young larva of *Geometra papilionaria* prepares a silken web, to which it attaches itself by its anal claspers, and remains thus for hybernation during the winter; it looks much like a small twig of the alder or birch to which it is attached, and is brown in colour, the bright green coat being assumed in spring.

The larvæ of *Phorodesma smaragdaria* are to be found on the Essex salt-marshes, in September, by searching *Artemisia maritima*. They

are strange little atoms, with scraps of the food-plant gummed over their bodies.

The larvæ of *Abraxas sylvata* (*ulmata*) are to be beaten, during this month, from wych-elm. The larva of *Asthena blomeraria* is also to be beaten from the same food-plant and is said to prefer the undersides of the leaves, if searching be preferred to beating.

The pupa of *Zonosoma linearia* is fastened to a leaf of beech, the margin of the leaf often curling over and concealing the pupa; the pupa of *Z. porata* is similarly fastened to an oak-leaf; that of *Z. punctaria* to a leaf of oak or birch, and that of *Z. pendularia* to birch (Merrin).

The flowers of *Lysimachia vulgaris* should be well searched and beaten for larvæ of *Collix sparsata*, which sometimes occur also on the leaves.

Cut off, during the last week of September and the first of October, a bag full of the unripe seed-capsules of *Odontites rubra* (*Bartsia odontites*); turn these into bandboxes, with muslin over the top, remove from the muslin as they come up, and place in cage or flower-pots with fresh food and sand, and they will soon pupate. Do not let the seed-capsules get too dry whilst the larvæ are feeding. *Bartsia* grows as a weed by roadside hedges, on waste land, rough pastures, &c.

Search the umbels of *Angelica sylvestris* and *Pastinaca sativa* for larvæ of *Eupithecia albipunctata* and *E. trisignata;* and those of *Pimpinella saxifraga* for larvæ of *E. pimpinellata* and *E. oblongata*, from the middle to end of September.

In September search out a locality where ragwort abounds. Beat the ragwort-heads against the side of an old umbrella. Several species of *Eupithecia* larvæ are thus to be obtained; among others *E. satyrata*, *E. centaureata* and *E. absynthiata* are usually the most abundant.

On the second Saturday in September we could, by seeking after dark with a lantern, see the larvæ of *Eupithecia succenturiata* in plenty on the upper parts of the mugwort plants, whilst, during the daytime, they are only to be found on the lower portion of the plants, on, or amongst, the twisted dead leaves (Gregson).

Collect the flowers and leaves of yarrow (*Achillea millefolium*) in September and October, and you will breed *Eupithecia subfulvata*.

The larvæ of *Eupithecia arceuthata* feed on wild juniper from the end of September to the middle of November. They are seldom full-fed until the end of October.

The larva of *Eupithecia helveticata* feeds on wild juniper, and is full-fed from the beginning of September.

The larvæ of *Eupithecia pimpinellata* may be found in scores on the seeds of *Pimpinella saxifraga* in September. Some of the larvæ were green when the seeds were green, but later in the season, when the seeds were brown, the larvæ were chiefly brown (Hodgkinson).

Beat *Solidago virgaurea* from the middle to end of September for larvæ of *Eupithecia virgaureata*, and also from now until middle of October for those of *E. expallidata*.

Spruce-fir cones should be collected during September for the larvæ of *Eupithecia togata*. They feed between the scales of the cone, upon the ripe seeds at the base. The protruding frass makes an affected cone quickly recognisable.

The larvæ of *Eupithecia satyrata* may be found feeding upon the flowers of *Scabiosa succisa* in early September (Crewe).

Small and full-fed larvæ of *Eupithecia pygmaeata* are to be obtained during the whole of September, and the imagines mostly emerge the next year from June till the middle of August, some going over until a second year.

Larvæ of *Eupithecia albipunctata* are abundant in September feeding on *Pastinaca sativa* and *Angelica sylvestris* (common at Box Hill, Caterham, Askham Bog, &c.).

In September the larvæ of *Eupithecia trisignata* are often very abundant, feeding on the flowers of *Pastinaca sativa* (particularly common at Box Hill, in the York district, &c.).

In September the larvæ of *Eupithecia assimilata* may be searched for on, or beaten from, hop.

The larvæ of *Eupithecia minutata* and *E. nanata* can be swept from *Calluna* in September and October.

The large beds of *Chenopodium*, which are to be found flourishing on the waste places near river-banks in most districts of England, should be beaten in September and October for the larvæ of *Eupithecia subnotata*. Many larvæ fall to the ground and want searching for there.

The flowers of *Senecio jacobaea*, in September and October, give a plentiful supply of larvæ of *Eupithecia absynthiata* and *E. satyrata*.

The pupæ of *Eupithecia fraxinata* can be found enclosed in a cocoon, all through the winter, under moss and loose bark of ash-trees, from September till May.

The imagines of *Thera firmata* are to be taken in September and October on the boles of fir- and larch-trees, just out of pupa.

The imagines of *Cidaria psittacata* are to be obtained at ivy, or hiding in outhouses, in September and October; they hybernate later.

Cymatophorides.—The larvæ of *Cymatophora duplaris* and *C. fluctuosa* are still to be found between united birch-leaves, and those of *C. ocularis* between those of poplar; better to beat by night.

Cochlidides.—The almost full-grown larva of *Cochlidion limacodes* (*testudo*) is to be beaten from oaks, from the first week of September onwards in our southern woods.

The larva of *Heterogenea cruciata* (*asella*) must be obtained by searching the beeches from the middle of September until the end of October. It is a very uncertain species, apparently absent in its best locality (Lyndhurst) in some seasons, whilst quite abundant in others.

Sphingides.—The morning twilight in September is said to be better than the evening twilight to capture *Sphinx convolvuli*, at the blossoms of petunias. Most captures, however, are made in the evening when dusk has fully fallen.

The larvæ of *Acherontia atropos* should be persistently sought during this month. The men at work in the potato-fields will, in some seasons, get a very large number and want but little coaching in the art of handling them carefully and carrying them safely. Rough handling is otherwise responsible for the death of many when the pupation stage is reached. Pupæ, too, are often obtained, and without previous training injury is still more likely to be done to the captives.

During this month the larvæ of *Deilephila gallii* will be found freely

on *Galium*, whenever there has been an immigration of imagines in June; not difficult to find during the day, either low down among the plant or basking; and often traceable by the large and conspicuous pellets of frass. The small plants on the shingle at Deal, Walmer and Kingsdown, and the larger beds distributed over the sandhills at Deal, Wallasey and the Essex and Suffolk coasts usually produce a large number in its special seasons. Larvæ of *Macroglossa stellatarum* are usually taken abundantly at the same time.

About the second or third week in September specimens of *Choerocampa celerio* may sometimes be seen hovering over the flowers of scarlet geraniums; on the wing as early as 7 p.m.; in 1885 captures were made September 20th and 24th, two being observed during the latter evening (Mason).

The isolated patches of *Galium* that grow on the shingle in our coast districts often harbour large numbers of the larvæ of *Macroglossa stellatarum* in September.

Lymantriides.—The larvæ of *Demas coryli* are to be beaten from beech, in the middle of September, and larvæ can generally be obtained in most districts where the imagines have been observed in June and July.

In the third week of September the larvæ of *Notolophus gonostigma* may be beaten from oak and birch in Sherwood Forest (Porritt).

Notodontides.—The larvæ of the Notodonts should now be worked for, *Lophopteryx camelina* (oak, beech, &c.), *L. cucullina* (maple), *Leiocampa dictaea* (poplars, willow), *L. dictaeoides* (birch), *Notodonta dromedarius* (birch, nut, &c.), *N. ziczac* (poplar, willow, &c.), etc.

The larva of *Stauropus fagi* is now to be beaten; it prefers beech, but is also found on other trees—oak, birch, hazel, &c.

In early September alder is one of the best paying trees to beat for larvæ. Visions of the full-fed larva of *Cerura bicuspis* are always well to the fore.

The cocoon of *Cerura vinula* is to be found spun-up on trunks of willows, poplars and sallow, about 3ft. to 4ft. from the ground (Merrin). Most entomologists search for the Cerurid cocoons in October.

Noctuides.—The beginning of September will be found a good time to commence searching for pupæ of *Agriopis aprilina*, *Hadena protea*, &c., at the foot of oak-trees; all pupæ taken at oak should be specially cared for, as a host of good insects feed on this tree and pupate round the base; the trunks should also be well examined during September and October in hopes of finding *Poecilocampa populi*, which spins up in the crevices of the bark; it must be borne in mind that trees standing singly in parks and fields are the most prolific (Mason).

The larvæ of *Apatela aceris* are not uncommon in the London district; usually seen crawling on trunks, fences, &c., when they have left the trees and are seeking a suitable place for pupation.

The larvæ of *Cuspidia megacephala* are still to be found coiled up by day, on the trunks of poplars, where they rest when full-fed and just before pupation; they are usually conspicuous enough if carefully looked for.

A warm overcast afternoon in middle September will give plenty of *Celaena haworthii* flying over the mosses; a clear sunny afternoon prevents their flight, but given dull calm and moist weather the males fly freely (Finlay).

Celaena haworthii must be worked for on mosses and bogs in September, between 6.15 p.m.-7 p.m. Before 6.15 p.m. there may not be a specimen visible, but a few minutes after there may be hundreds (Stott).

The larvæ of *Agrotis ripae* are to be found by day, just below the sand where *Salsola kali* grows, in September and October.

In the beginning of September *Agrotis agathina* is to be found feeding at the blossoms of *Calluna vulgaris* by night.

Ragwort bloom in September sometimes gives an abundance of imagines of *Noctua glareosa*.

The carpet-like layer of needles and moss at the foot of a pine-tree wants rolling back, when the pupæ of *Panolis piniperda* are readily found at about a foot from the tree (Norman).

Towards the middle and end of September, when the ordinary autumnal sugaring is generally considered finished, *Epunda lutulenta*, *Aporophyla australis* and other local species, often occur freely in coast districts.

Epunda lichenea occurs in September at Portland, but does not begin to fly until about midnight.

Larvæ of Cucullias should be sought for early in the month—most are better obtained, however, in August—*Cucullia asteris* is still obtainable on golden-rod and *Aster tripolium*, *C. absynthii* on wormwood, *C. gnaphalii* on golden-rod, &c.

Just as we come up to the wood from Kemsing, are high banks on each side of the road. The golden-rod (*Solidago virgaurea*) on these should be carefully examined for larvæ of *Cucullia asteris* and C. *gnaphalii* (Carrington).

Some of the Dianthœcias are more or less partially double-brooded, and their emergence is continued over a long period; late larvæ are, therefore, often obtained during this month, *e.g.*, those of *Dianthœcia capsophila* on seed-heads of *Silene maritima*, *D. capsincola* on *Lychnis* and *Silene*, *D. carpophaga* on *Lychnis*, &c.

In September the imagines of *Citria fulvago* and *C. flavago* often frequent the dry feathery-looking grass-heads by the sides of the rides of woods; they are also attracted to honey-dew on sallow leaves much more frequently than to sugar.

The eggs of *Cirrhoedia xerampelina* are laid on ash, probably in the chinks of the twigs, buds, &c. (Merrin).

In early September, *Ononis* should be swept after dark for larvæ of *Chariclea umbra* (*marginata*).

Larvæ of *Chariclea umbra* (*marginata*) and *Heliothis dipsacea* feed well on the green pods of scarlet-runner beans, *Hadena pisi* and the Plusias eating them just as freely. Possibly they would do well for *Dianthoecia irregularis*, &c. (Norgate).

During September sweep ling (*Calluna vulgaris*) for larvæ of *Anarta myrtilli*. The larva of this species is very difficult to obtain in any other way, its similarity to its food-plant being most striking.

During September (and August) the larva of *Erastria fasciana*

(*fuscula*) is to be swept by night from *Molinia caerulea* (and perhaps other grasses). The larva pupates about the end of the month.

Arctiides.—The larvæ of *Spilosoma urticae* should be searched for in marshes and fens where *Iris*, *Pedicularis*, *Trifolium* and *Mentha aquatica* grow abundantly in the first week in September. They feed on all these plants, and are to be found extremely low down, on plants overhanging water-holes and ditches.

Papilionides.—Sleeve larvæ of *Apatura iris* out on sallow, so that they can get on a thick branch; they must be removed from the sleeves every day till they settle down on a twig, as none ever hybernates successfully if left on the sleeve (Hewett).

The eggs of *Cyaniris argiolus* (second brood) are laid on the flower-stalks of ivy; the young larvæ burrow in the unexpanded buds.

OCTOBER.

October is generally a most uncertain month entomologically. So much depends on the meteorological conditions, on whether sugar will pay, and whether the ivy-blossom is in just that condition on suitable evenings to attract a multitude of insect visitors. If the weather be really satisfactory, much out-of-door work can be done even with imagines, but it is rather to pupæ that the hopes of the lepidopterist turn, and many are the details that a successful pupa-hunter must grasp before he can become at all proficient at the work. Among other things, the tops of moss-covered stumps of trees that have been cut down should be carefully peeled for pupæ, and the moss growing on, and around the roots of, trees must be thoroughly worked, but pupa-digging, undoubtedly, enables a collector to employ his leisure in winter and spring in the most profitable manner; a trowel and a three-pronged fork with prongs bent backwards for pulling up turf are useful tools for the purpose. In October and November the various enemies of pupæ have not had time to find a very large proportion of them. Search under moss on (or at roots of) trees for pupæ of *Demas coryli*, *Eurymene dolabraria*, *Odontopera bidentata*, *Eupithecia consignata*, *E. fraxinata*, &c.; dig around the roots for pupæ of Notodonts, also for those of *Cymatophora ocularis*, *Selenia bilunaria*, *Amphidasys strataria*, *Tephrosia bistortata*, *T. crepuscularia*, *Asthena blomeri*, &c, especially working with the fingers where the surface of the earth meets the trunk; search under loose pieces of bark for cocoons of *Poecilocampa populi*, *Triaena tridens*, *Acronicta leporina*, &c., and search the trunk itself for those of *Cerura bicuspis*, *C. furcula* and *C. bifida*. Dead leaves about the roots of trees give cocoons of *Heterogenea cruciata* (*asella*), *Cochlidion limacodes* (*testudo*), *Dimorpha* (*Endromis*) *versicolora*, *Lachneis lanestris*, *Stauropus fagi*, *Clostera curtula*, *C. pigra* (*reclusa*), *Cymatophora or*, *C. fluctuosa*, *Lobophora sexalata*, &c., and pupæ of *Zonosomae* (fastened by tail to leaves). For the smaller species the collection of the seed-heads of various plants will give a good return for the time spent. The seed-heads of gentian, wild carrot, *Pimpinella saxifraga*, &c., collected in the autumn, placed in covered flower-pots, and stood out-of-

doors, will give imagines of *Semasia rufillana*, *Œcophora flavimaculella*, *Asychna profugella*, *Eupithecia pimpinellata*, &c., the following spring. It is well to bear in mind in rearing larvæ of Noctuids, Agrotids, &c., that feed through the winter, that sliced potato or carrots, buried in a tub of sand, make very acceptable winter fare. Some thought of the following year is also necessary, and Mason states that he has found many moths particularly fond of the flowers of lavender, and recommends any entomologist who has a garden at command to plant a short row of it; cuttings put in during autumn, and kept in a cold frame, will root during the winter, and be ready to plant out the following May. Another point that must not be forgotten by hasty collectors is that it is not wise to proceed hurriedly in throwing out one's entomological breeding-cage rubbish without very close inspection, as so many species go over two (or more) winters in the pupal stage—the Cucullias are specially noted for this peculiarity—but many other species are equally persistent in going over—*Cidaria reticulata*, *Emmelesia unifasciata*, &c.—and pupæ of some species will go over four or five winters.

Nepticulides.—The mines of Nepticulids are best collected in October; later the larvæ leave their mines in order to find a suitable place in which to spin their cocoons, which, in many cases, is not on the leaf in which they have fed up. Many species will be missed unless the mines are collected early. Oak-leaves give *Nepticula atricapitella*, *ruficapitella*, *basiguttella*, *quinquella*, *subbimaculella*; birch gives *N. betulicola*, *argentipedella*, *woolhopiella*, *confusella*, *continuella*, *luteella*, *lapponica*, *distinguenda*; elm, *N. viscerella*, *N. ulmivora*, *N. marginicolella*; on *Rosa canina* one finds *N. anomalella*, *N. angulifasciella*; on *Rosa arvensis*, *N. fletcheri*; on *Rosa rubiginosa*, *N. centifoliella*; on hawthorn, *N. pygmaeella*, *N. ignobilella*, *N. atricollis*, *N. gratiosella*, *N. regiella*, *N. oxyacanthella*; on *Pyrus malus*, *N. pomella*, *N. desperatella*, *N. malella*, *N. pulverosella*; on *Pyrus communis*, *N. minusculella*, *N. pyri*; on *Pyrus aucuparia*, *N. aucupariae*, *N. nylandriella*, *N. sorbi*; on *Rubus fruticosus*, *N. aurella*, *N. auromarginella*; on *R. caesius*, *N. rubivora*, *N. splendidissimella*; on *Agrimonia eupatoria*, *N. agrimoniae*, *N. aeneofasciella*, *N. fragariella*; on *Fagus sylvatica*, *N. turicella*, *N. basalella*; on *Populus tremula*, *N. argyropeza*, and *N. assimilella*; on *P. nigra*, *N. trimaculella*; on *Lotus corniculatus*, *N. eurema*, *N. cryptella*, &c. [For a complete history of the British and Continental species, the food-plants, mode of feeding, &c., see the author's *British Lepidoptera*, vol. i., pp. 162 *et seq.*]

The larvæ of *Nepticula lapponica* feed in broad serpentine mines in birch-leaves, and should be collected at the same time as those of *N. betulicola*, *viz.*, from October 1st-20th (Threlfall).

During October the yellow larvæ of *Nepticula aeneofasciella* may be obtained in the blotches in leaves of *Agrimonia eupatoria*.

Mines of *Nepticula catharticella* often occur in great numbers in leaves of *Rhamnus catharticus*, but are difficult to see until one's eye becomes accustomed to them.

Larvæ of *Nepticula myrtillella* are sometimes common in moorland districts in leaves of *Vaccinium myrtillus*.

The larva of *Nepticula desperatella* mines in the leaves of wild

apple-trees in October. It prefers the leaves on the small inconspicuous shoots that grow close to the ground.

In October the larva of *Nepticula headleyella* makes a long and very narrow gallery in the leaf of *Prunella vulgaris*. The affected leaves are of a dull purple colour.

The orange-coloured larvæ of *Nepticula pomella* are to be found in October and November in the leaves hanging from the lower branches of apple-trees. Sometimes there are as many as half-a-dozen larvæ in a single leaf.

Mines of *Nepticula alnetella* and *N. glutinosae* both occur in alder-leaves.

Lithocolletides.—Mines of *Lithocolletis stettinella* occur in alder-leaves; the larvæ are partial to the small leaves at the end of the twigs.

In October and November collect the leaves of *Vicia sepium* and *Orobus tuberosus* for mines of *Lithocolletis bremiella*.

The mines of *Lithocolletis anderidae* made in birch-leaves should be collected in October.

In some localities the mines of *Lithocolletis comparella* are common in leaves of many species of *Populus*, but prefer the garden one with white undersides to its leaves. The moths emerge almost at once.

Larvæ of *Lithocolletis viminetorum* should be sought for in mines at the edges of leaves of *Salix viminalis*.

Coleophorides.—The following Coleophorid larvæ should be searched for:—*Coleophora limosipennella* and *C. wilkinsoni*, on birch; *C. paripennella* on bramble, rose, sloe, &c.; *C. fuscocuprella* on hazel; *C. argentula* on *Achillea millefolium*: *C. potentillae* on bramble, *Potentilla tormentilla*, *Spiraea filipendula*, *Poterium sanguisorba*, &c.; *C. badiipennella* on elm.

Larvæ of *Coleophora murinipennella* should be collected through the autumn on seeds of *Luzula pilosa*. The species occurs freely at West Heath, Hampstead (Elisha).

The cases of *Coleophora argentula* are sometimes to be obtained in great abundance in October, on the seed-heads of yarrow.

In October the larvæ of *Coleophora salinella* should be collected from *Suaeda maritima* growing on the coast salterns.

The full-fed larvæ of *Coleophora wilkinsoni* should be collected from birch in September-October. They hybernate full-fed, crawl about in early spring without feeding, then pupate, and the imagines emerge about the end of June.

Gracilariides.—Bladder-like leaves of *Artemisia vulgaris* should be collected in October for larvæ of *Gracilaria omissella*.

Elachistides.—The brown mines of the larvæ of *Antispila treitschkiella* should be obtained on dogwood the first week in October.

During October the larva of *Elachista dispunctella* mines in *Festuca ovina*. It hybernates in old grass-stems and pupates later in spring (Threlfall).

Tortricides.—During the winter the dry stems of *Umbelliferae*

should be opened for larvæ. Many species retire therein to pupate, that feed on other plants.

Peronea tristana and *P. ferrugana* are to be beaten from their respective food-plants *Viburnum lantana* and *Betula*. Both are very variable, so should be carefully examined.

Collect fallen and diseased acorns; place in a shallow box containing leaf-mould and dead leaves. Stand out-of-doors during the winter until June, and *Carpocapsa splendana* will be bred in plenty.

Dictyopteryx lorquiniana may be bred in abundance from the flower-heads of *Lythrum salicaria* collected in October, and from shoots of the same plant found in June (Farren).

During the autumn collect the common beech-mast for the larvæ of *Carpocapsa grossana*. The full-fed larvæ avail themselves of cork and rotten wood in which to bore. They remain during the winter as larvæ in the cocoons, and often go over two winters in this condition. They should be placed out-of-doors until the following spring, when they can be brought into the house.

Collect diseased hips from wild rose. The larvæ of *Stigmonota roseticolana* emerge from them from the middle of September to the middle of October; place in the jar with the hips a few moderate-sized pieces of rotten wood, and cover well so as to prevent the larvæ from escaping. When all have buried themselves in the rotten wood, place out-of-doors during the winter, bringing them in again in May. The imagines should be reared in plenty in June.

The cocoons of *Stigmonota regiana* are to be obtained during autumn and winter under the bark of old sycamore trees; the larva appears to remain in its cocoon unchanged until spring.

From October until April the larva of *Ephippiphora nigricostana* may be found in the stem and root of *Stachys sylvatica*, climbing in April into the dried flower-stems, where it pupates just below a joint in the stem.

From October to April split the stems of *Impatiens noli-me-tangere*, for the active whitish-green larva of *Penthina postremana*. When the affected stems can be detected without splitting them, do not do this, as it interferes with the hybernation of the larva.

The larvæ of *Catoptria candidulana* feed on the seeds of *Artemisia maritima* during the autumn months.

In October dig up whole plants of ragwort where they are known to contain larvæ; plant in shallow boxes, a dozen or two in each box, and place in garden through the winter; if brought indoors in June *Ephippiphora trigeminana*, *Eupoecilia atricapitana*, &c., will be bred.

Cut off shoots of mugwort six or eight inches from the ground and plant them in seedling boxes, two or three dozen in each; place in garden through the winter; if brought indoors in June *Ephippiphora foeneella*, *Dichrorampha simpliciana*, &c., will be bred in July.

Roots of wild carrot, yarrow, thistles, &c., yield very good results in the same way, and they are all plants that defy extermination.

Collect heads of teasel in October (in the better cultivated parts of the country they are destroyed before spring); tie in bundles and suspend out-of-doors during the winter; put in a band-box in June, and *Eupoecilia roseana* and *Penthina gentiana* will be bred.

Collect upper two-thirds of stems of wild parsnip, and treat in same way (as last) for *Conchylis dilucidana*. Take care that the stems are placed out of the reach of earwigs.

Golden-rod, *Aster tripolium*, *Anthemis*, &c., collected and tied up in similar bags, and treated similarly, give good results.

The first week in October is the time to collect the full-grown larvæ of *Argyrolepia maritimana:* at that time they are to be found mining in the roots of *Eryngium maritimum*, sometimes to a depth of six or eight inches below the surface of the sand; the long pipe-like roots, for about three inches of sound root beyond the mine, must be taken out very carefully, and the mined roots should not be opened but buried upright in sand.

Larvæ of *Conchylis smeathmanniana* are now about full-fed, and are to be found in seed-heads of *Achillea millefolium*, connecting the seed-heads with a silken gallery. [Butterfield suggests keeping them through the winter in bags made of the material in which Australian mutton is exported.]

Roots of *Picris hieracioides* should be dug up for larvæ of *Chrosis tesserana:* plant in tubs or large flower-pots and leave out all the winter.

The seed-heads of golden-rod should be collected in October, and kept out-of-doors during the winter. In spring they should be put under cover, and in this way it is possible to breed *Eupoecilia subroseana* freely in May and June.

Pyraloides.—Beating thatch is a most profitable employment in the autumn; large numbers of local *Depressariae* and other species are more readily obtained in this than in any other manner.

The larvæ of *Lita acuminatella* are to be found in October mining the leaves of thistles; the imagines emerge freely the following spring; common in Hackney Marshes.

Collect heads of burdock for larvæ of *Parasia lappella:* of *Centaurea nigra* for larvæ of *P. metzneriella:* of *Carlina vulgaris* for *P. carlinella;* of *Cirsium acaule* for *P. neuropterella*.

At the end of October the larva of *Nothris verbascella* is to be found eating out the undeveloped leaves at the heart of plants of *Verbascum pulverulentum*. It feeds slowly through the winter, and full-fed specimens are to be found throughout the spring until the middle of June. In July the pupa is to be found in a slight web on the underside of the large lower leaves, generally in the angle of two ribs, or in the turned-down edge of a leaf.

Beat hedges containing spindle for *Pteroxia caudella* before it hybernates.

Crambides.—During the winter months the dried stems of thistles should be collected for the larvæ of *Myelois cribrum*.

During the winter the hybernating larvæ of *Anerastia farrella* are to be obtained in sandy localities, where *Anthyllis vulneraria* grows, in their sand-balls, by passing the sand through a sieve (Schleich).

During the winter months (October to March) the full-fed larvæ of *Homœosoma sinuella* may be found feeding in the root-stocks of plantain. They spin cocoons in March, but the larvæ do not pupate until May and early June.

Larvæ of *Euzophera cinerosella* (*artemisiella*) feed during the winter and spring in the stems and root-stocks of *Artemisia absinthium* (Barrett).

Orneodides.—Beat thatch of old summer-houses in gardens and *Orneodes hexadactyla* may be obtained in plenty.

Pterophorides.—The pupæ of *Amblyptilia acanthodactyla* are to be found in October (and November) attached by the anal segment to the flower-spike of *Stachys sylvatica*, between two of the whorls of seed-vessels, where they look like dried-up flowers.

Cymatophorides.—In October, beating for larvæ by night often pays better than beating by day; *Cymatophora fluctuosa* and many other birch-feeders hide in spun-leaves by day, but fall readily into the beating-tray at night.

The roots of old poplars always provide a prolific hunting-ground for the collector of pupæ. One of the best finds is *Cymatophora ocularis*, which may be found spun-up under bark, moss, among rubbish, or spun-up among ivy leaves three or four feet from the ground, attached to old stumps near, in fact, in any corner, but they want carefully searching for, as they are easily crushed (Robertson).

At the roots of oak one finds, among large numbers of common Tæniocampid and other pupæ, those of *Cymatophora ridens*.

Drepanulides.—During October the spun-together leaves of birch should be collected for larvæ and pupæ of *Drepana falcataria*; similarly fastened-together leaves of beech will give larvæ and pupæ of *D. cultraria* (*unguicula*). The larvæ of these species are, however, much more readily obtained by beating at night, as they hide in their little leaf domiciles by day but leave them to feed at night.

Geometrides.—The imago of *Himera pennaria* flies at dusk in October and November (comes also very freely to light). Many may be sometimes found at rest on the bare twigs of bushes afterwards, and, when at rest, they very closely resemble dead leaves.

Larva-beating is often most successful during this month—*Selenia tetralunaria*, *Amphidasys betularia*, *Zonosoma linearia*, *Z. annulata*, *Asthena luteata*, &c., are thus to be obtained.

The moss at the roots of fir-trees should be carefully rolled back for the pupæ of *Macaria liturata* and *Fidonia piniaria*; they are usually obtained at only a short distance below the surface of the ground.

Larvæ of *Melanthia ocellata*, *Larentia salicata* and several other moths, are full-fed in October, spin a silken web, but do not change to pupæ until the spring. Care should be taken not to interfere with such when once the puparia are made, as disturbance in this stage is usually fatal.

The larva of *Urapteryx sambucata* hybernates well either in the open air or under cover, in a shed or outhouse; if in the open air, a strong muslin bag tied to a branch of *Prunus spinosa*, in a sheltered position, forms a good winter-cage; if under cover the twigs should be placed in a bottle of water and the larvæ secured by a muslin bag tied round the neck of the bottle; the larvæ should be supplied with fresh food so long as a vestige of green leaves is obtainable (Grapes).

In October and November the regular worker at ivy-bloom will probably get *Camptogramma fluviata* and *Cidaria miata* among the usual common visitors. Always keep any ♀ *C. fluviata* that falls into your hands for eggs. Autumnal eggs soon hatch, and, in confinement, the larvæ usually feed up quickly and produce another brood in a very short time.

After dark *Thera juniperata* is to be found in great numbers resting on juniper bushes.

You can still collect the seed-heads of *Bartsia odontites* for larvæ of *Emmelesia unifasciata*. Tie up in linen bags or keep in band-box, and give fresh heads until pupation has taken place.

The pupæ of *Emmelesia albulata* will be found within the spun-up sepals of yellow rattle.

Beat juniper during September for larvæ of *Thera simulata* and *Eupithecia arceuthata*.

Collect flowers or seed-heads of *Achillea millefolium* for *Eupithecia subfulvata*, golden-rod for those of *E. expallidata*, ragwort for *E. absynthiata*, *Knautia arvensis* for *E.* var. *knautiata*, &c.

The larva of *Eupithecia arceuthata* feeds on wild juniper from the middle of September to the middle of November; it is seldom full-fed until the end of October (Crewe).

The pupa of *Eupithecia fraxinata* is to be found enclosed in a cocoon under moss, on the trunks of ash-trees, from September until May; as many as fifteen were taken in 1898, in one small hollow in the trunk of a pollard ash (Robertson).

Eupithecia campanulata larvæ feed on the seeds of *Campanula trachelium*, and may also be found in gardens on cultivated varieties of Canterbury bells. These may be collected, according to the season, from late July until October.

You may still collect the flowers of golden-rod (*Solidago virgaurea*) in October; put into a large band-box or breeding-cage, and you will breed *Eupithecia virgaureata* and *E. expallidata* the following year.

The eggs of *Cidaria immanata* must be kept out-of-doors all the winter if one wishes to ensure the hatching of them (Porritt).

The imagines of *Chesias spartiata* are best obtained by searching the broom bushes after dusk with a lantern; the larvæ may be beaten in May and June.

Lachneides.—The pupæ of *Poecilocampa populi* are to be found in October either under loose bark or spun-up among grass and rubbish at roots of oak, elm, willows, and poplar (Robertson); under bark of willow-trees seems to be a specially favourite situation.

Sphingides.—The larvæ of *Acherontia atropos* are still to be collected, and the help of men who are potato-digging in fields or market-gardens should be requisitioned both for larvæ and pupæ; when potato-leaves are not available for late larvæ—jasmine, tea-tree, *Lycium*, and other food-plants may be obtained. Pupæ rarely pass successfully through the winter, and most success is obtained by forcing them at a very high temperature; once the forcing process has been begun, there should be no slackening, and the temperature should not be allowed to fall very appreciably even at night.

The best way to treat the larvæ of *Acherontia atropos* in confine-

ment, is to procure an old tea-chest, or some other similarly sized box, which will give plenty of room to hold the potato haulm, without letting it touch the sides of the box; then get some phials with large mouths, so as to hold the stalks of the haulm, keeping the stalks firm in the bottles by filling up the necks with moss, which also prevents any chance of the caterpillar tumbling into or wetting itself with the water. Then fill the box with fresh earth up to the level of the tops of the necks of the bottles, so that the caterpillars can crawl from one batch of haulm to another, which they might not be able to do unless the earth be level with the top of the phials; cover the whole chest with muslin or strong net, which will let the air through and not exclude the light, and place it somewhere in the open air where the sun is not too hot upon it, but where it gets free light. Thus you will have secured for them, as far as possible, the same surroundings as though they were in a state of nature. The droppings should be cleaned from the top of the earth every day, and fresh potato-haulm given every night and morning, whether they have consumed it all or not, as fresh food is one of their first requirements, and, if possible, the haulm should be always gathered from the same plot, or rather from the same sort of potato. There, then, the caterpillars may remain until they reach their full-growth, but directly they begin to change colour and show a restless disposition, crawling round and round the bottom of the chest, they should at once be removed and each caterpillar placed by itself in a rather large flower-pot filled with fresh damp earth, leaving only about an inch of room to spare between the surface of the soil and a heavy book placed upon the top of the pot. This answers well as they one and all bury directly. On each pot chalk the date of the disappearance of the caterpillar beneath the soil and let them remain untouched for a fortnight, after which time carefully remove the earth and put the chrysalis into an incubator; in no case should the pot be shaken or moved wherein the larva has buried. Moving them backwards and forwards causes the walls of the slender cell which the caterpillar forms under the earth to collapse, and the upper part of the pupa, which for several days remains very tender, becomes flattened out of shape (Morres).

The pupæ of *Smerinthus ocellatus*, *S. populi*, *S. tiliae*, *Sphinx ligustri*, *Choerocampa elpenor*, in fact all our strictly native species, are best kept throughout the winter and allowed to emerge naturally at the usual time of appearance in the imaginal state. Those pupæ resulting from immigrant parents—*Macroglossa stellatarum*, *Deilephila gallii*, *Acherontia atropos*, *Sphinx convolvuli*, &c.—should be forced, as they rarely emerge satisfactorily if kept through the winter.

My incubator, or rather incubators, for I had so many pupæ that one would not hold them all, for forcing pupæ of *Acherontia atropos*, consisted, in each case, of an earthenware crock, some two and a half inches deep, and about twelve or thirteen inches wide. In this I first laid a thin layer of gravel to act as drainage, and on that, some two inches of moss, well pressed down, so as to afford a soft but firm foundation for the pupæ to rest on; for if the moss be too loose, there is a danger of the moth on emergence getting entangled, and working downwards instead of upwards; in which case the wings would never fully develop, although the moth in the end might be able to extricate itself. On this firm substratum of moss lay your pupæ, handling

them as tenderly as you can, and then cover them over with an inch or more of loose moss, so that they can easily make their way through it on emergence. Then, on the top of the moss, balance a tripod of fairly large sticks for the moths to climb up upon directly they change. This is most important, as the wings of the moth must hang down perpendicularly from the body until they are fully developed (which takes about an hour and a half to effect). Next cover the whole apparatus with a bell-glass some twelve or fourteen inches high and just wide enough to fit inside the rim of the crock, and your incubator is complete. Before, however, the moss is put into the crock, you should soak it in boiling water and wring it out as dry as possible, then when it has grown cool enough to lay the back of your hand comfortably upon, deposit the pupæ on the top of it; the pupæ will wriggle themselves into a suitable position. Then cover them over with more hot moss, place the glass over all, and there is nothing more to be done. The soaking of the moss, however, in hot water should be renewed about every third day, so as to keep the temperature within the bell-glass of a consistently moist, as well as warm, heat. In order to keep the incubators of an uniform warmth, place them one in each corner of the dining-room grate, inside the fender, and make it a rule never to sit down to any meal without turning the incubator round; you thus ensure that each side of the crock shall receive an equal share of warmth, and, as a precaution against over-heating, cover the whole apparatus with a thick piece of brown paper on the side nearest the fire. Having duly carried out these instructions, patience alone has to be exerted and the reward will come (Morres).

The full-fed larvæ of *Sphinx convolvuli*, *Daphnis nerii*, &c., pupate well between two or three layers of flannel arranged in the bottom of the box in which they are placed, instead of earth. They spin a slight cocoon, are in no risk from the falling in of the material normally forming the roof of their slight earth-cocoon, and so injuring the changing larva or newly-formed pupa (Morres).

Simæthides.—*Xylopoda pariana*, in sunny weather, sometimes occurs freely on flowers of various *Compositae*: it also frequents thatch.

Notodontides.—In October and November work round the roots of willows, shaking the turfs and *débris* there collected, for the cocoons of *Leiocampa dictaea* and *Pterostoma palpina*, which will be found spun-up among the roots or rubbish; often so common on the small willows by the railway banks (Deal, Sandwich, &c.); also stated to prefer the side nearest the water when the bushes are near ditches, &c.

At the roots of oak one finds among hosts of common pupæ, those of several rare species such as *Drymonia trimacula* (*dodonea*), *D. chaonia*, &c.

The spun-up leaves of poplar should be searched for the full-fed and pupating larvæ of *Clostera curtula*.

Larva-beating will give many good species; among others, it is not yet too late at the commencement of October for belated examples of *Cerura bicuspis*.

Cocoons of *Cerura bicuspis* may be found until April, on birch- and

alder-trunks; in shape they resemble a Brazil nut; rarely above 2ft. from the ground (Merrin).

The cocoons of *Cerura bifida* are placed irregularly, sometimes on the bark at the level of the soil, sometimes well up, usually well within the line of vision; sometimes the larvæ go from the food-plants (poplar and aspen) to an adjacent tree or fence to pupate (but always near the food-plant).

Noctuides.—In October and November the regular worker at ivy-bloom will possibly get, among hosts of commoner species—*Epunda lutulenta*, *Xylina semibrunnea* and *Orrhodia erythrocephala*.

Ivy-bloom, during late October and November, should be searched for *Dasycampa rubiginea*. (November 15th, 1891, four specimens boxed between 6 p.m. and 7.30 p.m. by Mr. Bankes, others November 16th, 1891, and November 3rd, 1883.)

The imagines of *Dasycampa rubiginea* are to be taken at sugar as well as at ivy-blossom in October and November; they hybernate and occur again at the sallows and at sugar in the spring.

During October and November the most profitable field-work in suitable weather is undoubtedly pupa-digging. Those who prosecute this mode of work regularly usually get very gratifying results. At the same time work well under moss on trunks for cocoons spun-up there. The ash-feeding larvæ are particularly fond of moss in which to spin up.

A small trowel is, on the whole, the best implement to use for pupa-digging, a pupa-digger having the disadvantage of maiming most of the pupæ it happens to touch, though it is most useful in pulling away the grass round trees. A bark ripper is objectionable on the ground of the havoc it makes with trees, yet it can be used to advantage for picking off small piecies of bark (Hunter).

Search the trunks of ash-trees under moss, or under the stones on walls near, for the hard cocoons of *Craniophora ligustri*, also under the coping-stones of walls near privet hedges, where they are often placed.

In October the imagines of *Calamia lutosa* are to be found by searching the reeds after dusk with a lantern. The species has often been found to be abundant, when searched for in this manner, in localities where its presence was not before suspected.

The middle of October is the time to sugar for the very rare *Leucania unipuncta*.

The larvæ of *Caradrina morpheus* are to be found commonly in October, on various low plants—wild hop, *Chenopodium*, &c., and in gardens on horseradish, &c.

The larvæ of *Ceriyo matura* should be wintered on *Poa*, or coarse grasses, growing in a garden seed-pan filled with mould and protected by a muslin cover. It is advisable to examine the receptacle for predatory insects occasionally (Grapes).

Eggs of *Peridroma saucia* laid in autumn hatch in a short time, and the larvæ will feed on dock all the winter and produce imagines in May; the larvæ are very easily reared in large flower-pots filled with clean, loose sand, into which they can burrow and bury themselves by day.

Larvæ of *Noctua dahlii* and *N. umbrosa* will similarly feed throughout the winter in confinement, but are not usually so rapid in completing their metamorphoses.

The roots of old poplars are always a prolific hunting-ground for the collector of pupæ; *Smerinthus populi*, *S. ocellatus*, *Taeniocampa populeti*, &c., may be found.

The larvæ of *Aplecta nebulosa* should be hybernated on *Rumex*, planted in a circular wooden vessel a foot or two in diameter, and covered with muslin tied tentwise to a central support (Grapes).

The larvæ of *Plusia chrysitis* may be wintered on *Lamium album*, planted in a large size flower-pot, secured by muslin tied round the rim and to a central support. On the approach of winter the larvæ cease to feed, secrete themselves in the folds of the fallen leaves, where they remain throughout the winter; they recommence feeding very early in the spring (Grapes).

Arctiides.—The larvæ of *Lithosia rubricollis* are, in some years, abundant, full-grown at the end of October, feeding on lichens and mosses growing on elm-trees and on walls near those trees.

NOVEMBER AND DECEMBER.

Field work is practically finished for the year and the work of differentiating, arranging and labelling the captures of the year, has to be done. It may, perhaps, be well to note, in cleaning boxes, that naphthaline melts at a temperature of 80° C. and the fusion may readily be done in a test-tube over a spirit lamp. If a small brush be inserted in the test-tube and the liquid applied hot to the sides, corners or crevices of pocket-, postal-, relaxing-boxes, &c., it hardens immediately where applied, and is most efficient in keeping boxes so treated, free from mites. Pupa-digging and pupa-collecting are still by far the most profitable out-of-door work—the pupæ of *Smerinthus ocellatus*, *Pterostoma palpina*, *Notodonta ziczac* and *Tephrosia bistortata* may still be obtained at the foot of willows; *Smerinthus populi*, *Leiocampa dictaea*, *Cymatophora ocularis*, *Cuspidia megacephala* and *Taeniocampa populeti* around poplars; *Smerinthus tiliae* at elm; *Selenia bilunaria*, *S. lunaria*, *Phigalia pedaria*, *Amphidasys strataria*, *Eupithecia exiguata*, *Lophopteryx camelina*, *Notodonta trepida*, *Drymonia chaonia*, *D. trimacula* (*dodonea*), *Taeniocampa miniosa* and *T. munda* at roots of oak; *Moma orion* in crannies of oak bark; *Tephrosia consonaria*, *T. bistortata*, *T. punctulata*, *Lophopteryx carmelita*, *Leiocampa dictaeoides*, *Notodonta dromedarius* at foot of birch-trees. Spun-together leaves under birch-trees will give cocoons of a variety of species, *e.g.*, *Endromis versicolora*, *Drepana falcataria*, *Cymatophora duplaris*, *C. fluctuosa*, *Asphalia flavicornis*, *Acronicta leporina*, &c.; trunks of trees must be searched for cocoons of Cerurids, Acronyctids, &c., and almost all *débris* under, and around the base of, trees is likely to prove productive. On warm evenings many Noctuid (and other) larvæ come out to feed; they are especially numerous by sheltered woodsides, in wood-ridings and wood-clearings, by the edges of sandhills, at foot of hedges, &c. Other work has already been suggested, *viz.*, to collect roots of golden-rod, tansy, &c., many species being obtained abundantly by this means; the last-named contains larvæ of many species—*Dichrorampha tanacetana*, *D. alpinana*, *D. sequana*, *D. petiverana*, &c. Elisha says that, during the winter months, the salt-marshes at Southend and Canvey (and undoubtedly almost all our

salt-marshes on other parts of the coast) give a variety of species, *e.g.*, larvæ of *Coleophora salinella* on *Atriplex portulacoides* and *Suaeda maritima*, those of *Coleophora tengstroemella* on *Chenopodium*, of *Coleophora artemisiella* on *Artemisia maritima*, of *Semasia rufillana* in seed-heads of *Daucus carota*, of *Conchylis francillonana* and *Argyrolepia zephyrana* in the stems of *D. carota*; whilst, in the heads of teasel, larvæ of *Eupoecilia roseana* and *Penthina gentiana* are abundant; larvæ of *Conchylis dilucidana* occur in the stems of wild parsnip, larvæ of *Gymnancyla canella* on *Salsola kali*, cases of *Coleophora argentulella* are plentiful on seed-heads of yarrow, whilst the larvæ of *Dichrorampha petiverana* are in the roots. All these may be collected in the dead season and will, in due course, produce imagines. Flower-heads of yarrow, golden-rod, aster, umbellifers, &c., should be collected and tied up in linen-bags, and roots of yarrow, mugwort, &c., should be planted in boxes, where the insect tenants will remain perfectly satisfied till spring arrives. Beating stacks and thatch will give many hybernating species—Depressarias, Gracilariids, &c.—in much better condition now than when they leave their winter-quarters; whilst the stems of *Umbelliferae* should be split open for larvæ, as those of many species retire therein to pupate after feeding-up on other plants. It now becomes a matter for serious consideration as to how pupæ are best kept through the winter; the summarised opinions of a great number of our most successful breeders of lepidoptera will be found in *Ent. Record*, ix., pp. 324-326. As supplementary to these we quote the remarks of the Rev. Bernard Smith, one of the most successful breeders of lepidoptera, who writes (*Ent. Rec.*, i., p. 264): "Larvæ frequently seek a sheltered place for pupation, and such species should be given the shelter from their various foes, which they require; a room with a fire is certainly the wrong place, but a place offering the degree of dampness possessed by a cellar or larder seems most suitable. As to the dampness of the earth in or on which pupæ are laid, a distinction should be made according to the season. In winter, when hard frost is to be looked for, the earth should be moderately dry, but when spring arrives, to put one's cages out in a warm drizzle occasionally is most desirable, and, more especially with insects like *Stauropus fagi* and *Notodonta dromedarius*, moisture is required as the period of emergence approaches. Then, as to the quality of the earth in which the pupæ should be kept. Mix light garden mould with silver sand and cocoa-nut fibre, in equal parts, and press the compost down rather firmly. Moss is objectionable as a covering to pupæ as encouraging insect pests. When it is necessary to bake the compost in order to destroy these, boiling water should be first added, and then the whole submitted to a heat rather above that of boiling water, in a kitchen oven, for twenty minutes. This does not make the earth caustic but kills all insect life. The cages in which to keep pupæ should be made of zinc (called "wash-ups" at the ironmongers), and they can be stored one upon another to save room. When pupæ have been unearthed, do not as a rule bury them in earth again, but a slight covering of cocoa-nut fibre should be used to prevent them drying up. Some pupæ require more moisture than others, among which may be mentioned *Petasia nubeculosa*, *Asteroscopus sphinx*, *Notodonta dromedarius*, *Craniophora ligustri*, *Arctomyscis* var. *myricae*, *Stauropus fagi*," &c. It may be well, perhaps, here to remind collectors that micro pupæ must be placed out-of-doors

if one is to be successful in keeping them healthy through the winter. With the Nepticulids this is even more important than with the Lithocolletids, although better success is attained with the latter when they are kept outside than when they are kept indoors. Coleophorids, too, do much better out-of-doors, and, as a general rule, micro-lepidopterists will do well to keep their pupæ exposed to the weather during the winter rather than nurse them with the idea of taking care of them. Some of the macros do not seem to get on so well when thus exposed, and Richardson thinks that exposure is more important when larvæ spin their cocoons in autumn, but do not become pupæ until spring. Many lepidopterists, however, consider it advisable to force certain pupæ; success in this is not always due to a mere matter of temperature, and some pupæ cannot be induced to give up their imagines by an increased temperature; a large flower-pot half filled with loose friable mould or cocoa-nut fibre, well-drained, answers well; lay a thin layer of moss on the mould, on this place the pupæ, then another thin layer of moss, the pot being covered with a piece of calico, damp regularly every morning, and place on a kitchen mantel-shelf, and many pupæ of Sphingids, Noctuids, &c., will emerge throughout the winter. Holland advises lepidopterists not to fail to put on sugar every possible night during November for *Dasycampa rubiginea* and suggests that it would probably be heard of in many more districts, if collectors did not give up sugaring too early. A good place to try is in or near an oak wood. If ivy be not near or convenient to search, you are recommended to cut off branches with bloom and place in favourable-looking spots, and it will double your chance; and, even if you do not get *D. rubiginea* or *Orrhodia erythrocephala*, other species as *Xylina semibrunnea*, *X. socia* (*petrificata*), *X. rhizolitha*, *Calocampa vetusta*, *C. exoleta*, *Hoporina croceago* and *Cidaria psittacata* may be attracted, sometimes till the end of November, in fact, in many seasons, ivy-bloom is not really at its best until November has arrived.

Adelides.—The larva of *Adela fibulella* lives in a flat case on leaves of *Veronica chamaedrys* (Merrin).

Coleophorides.—The larvæ of *Coleophora virgaureaella* should be collected in November, from the seed-heads of golden-rod. They are easy to rear if kept exposed to the influence of the weather.

In breeding *Coleophora therinella*, plant a thistle in a large flower-pot, low down in the pot, and leave the larvæ in this all the winter out-of-doors, with a piece of muslin tied over the top of the pot; the larvæ spin their cases on the sides of the pot and come out well, requiring no food in the spring.

Tortricides.—The larva of *Coccyx strobilella* feeds in the cones of spruce fir, which should be collected during the winter.

The first specimens of *Carpocapsa nimbana* obtained in this country were "bred by Lord Walsingham, from larvæ found hybernating in cocoons under moss on beech-trunks, in Buckinghamshire" (Barrett).

The larvæ of *Semasia obscurana* (*gallicolana*) live through the winter in the oak-apples or galls of *Cynips terminalis* fixed on the twigs of young oaks, preferring those of the preceding year's growth; the oak-apples should be collected in winter and early spring.

Stems of wild parsnip with conspicuous little nodules of white

frass, showing just above the lower nodes of the stem, will contain larvæ of *Conchylis dilucidana;* cut off the stems containing larvæ into convenient lengths and place in damp sand.

Machin used to breed *Conchylis dipoltana* freely from seed-heads of yarrow, collected at Southend in the autumn.

The pine-twigs bearing the large resinous cones in which are the larvæ of *Retinia resinana* should be placed out in the open, stuck into the ground, with no protection whatever during the winter. Bring them in, in April or May, place in very large flower-pots (better than a wooden box), tie a piece of calico over the top; almost every larva will pupate successfully, and the imagines emerge in due course.

Pyraloides.—Thoughout the winter, stacks of thatch, heath, turf, reed, and bracken, should be beaten for hybernating Depressarias and other moths.

By collecting the seed-heads of wild marjoram in November, and keeping them exposed to the weather during the winter, I bred a fine series of *Ptocheuusa subocellea* the following year (Elisha).

Cymatophorides.—Spun-together birch leaves should still be most carefully searched, for cocoons of *Cymatophora duplaris*, *C. fluctuosa*, *Asphalia flavicornis*, &c.

Almost all the *Cymatophora ocularis* in collections are bred from pupæ which are found spun-up at the roots of various kinds of poplars.

Geometrides.—Pupa-digging gives many useful species among the Geometrids—*Tephrosia bistortata* at the foot of willows, sallows, &c.; *Tephrosia crepuscularia*, at the foot of birch, oak, &c.; *Amphidasys strataria*, *A. betularia*, *Nyssia hispidaria*, and many others should also be obtained.

The hybernating larvæ of *Geometra vernaria* rest on the food-plant, *Clematis vitalba*, throughout the winter. They are then brown in colour, exactly like the dead stems, and drop at a touch, quite rigid. They should be supplied with fresh twigs, in confinement, as soon as the buds commence to swell in spring. After feeding a short time they moult and become green, and are then not easily to be found by searching, but must be beaten.

The pupæ of *Eurymene dolabraria* are to be found under moss on the bark of beech- and oak-trees, often directly under the edge of the moss, so that care should be taken in loosening the latter.

The male *Hybernia aurantiaria* sits on the leafless twigs of oak and birch, or hangs from the twigs and branches, or on the grass below, from the beginning until after the middle of November, after dark; pairing takes place about 9.30 p.m. At the same time *Cheimatobia boreata* also may be taken, sitting on the birches, but this species pairs earlier in the evening, directly after it is dark. Both species are common in the larval stage in May.

The pupæ of *Hybernia leucophaearia* are usually found at tree-roots among tufts of grass.

Around the base of *Silene* and *Lychnis* plants pupæ of *Eupithecia venosata* may be obtained.

The pupa of *Eupithecia dodoneata* may be found through the winter months under loose bark on hawthorn-trees.

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The slight earthen cocoons of *Eupithecia abbreviata* are sometimes spun at the root of a hawthorn-tree, where they may be found during the winter.

Lachneides.—The black cocoons of *Poecilocampa populi* are to be found in a variety of situations, more usually firmly fixed to the inside of a piece of loose bark, or spun-up closely among decayed leaves and rubbish at or near the base of a tree. Should be obtained in early November.

Place two large lamps about ten feet from the ground and about the same distance apart; about fifteen feet behind them hang a large dark sheet; *Poecilocampa populi* when attracted will rest quietly on the sheet (Holland); from middle of November into December, whenever the weather is mild and otherwise favourable.

About the middle of November look on the dark supports or framework of lamps for *Poecilocampa populi*.

The eggs of *Trichiura crataegi* may be found laid along hawthorn and sloe twigs, and those of *Poecilocampa populi* on hawthorn, oak, &c.

To hybernate *Macrothylacia rubi*, plant a root of heather out-of-doors; knock the bottom out of a cheese crate, put it round the heather and cover with perforated zinc. The larvæ come up in March and spin up without eating (Hewett).

Young larvæ of *Lasiocampa quercus* may be fed on bramble to the so-called hybernating stage (middle of November), but they will, if possible, go on feeding throughout the winter in mild weather, and then bramble leaves picked from sheltered places should be given. In cold weather they remain on the stalks of the food-plant motionless, but on warmer days will often move sluggishly and nibble their food, until in April they commence feeding again in real earnest. Keep in roomy cage and they are easily reared.

Saturniides.—The cocoons of *Saturnia pavonia* may be readily seen as soon as the heather has become thin on the moors, and in the hedges as soon as the latter have become leafless.

Sphingides.—The pupæ of *Smerinthus tiliae* should be searched for at the roots of elm and lime. Hollows in an old trunk are a favourite place for the pupation of this species.

Lymantriides.—In November, and on through the winter, the cocoons of *Dasychira pudibunda* are to be found among the loose rubbish collected about the roots of various trees or under loose bark. When fresh the cocoon is somewhat conspicuous, but afterwards is not at all easy to find.

The cocoons of *Demas coryli* may be found, sometimes plentifully, under moss, at the roots of beech-trees, very rarely on the trunk, all through the winter.

Notodontides.—Cocoons of *Cerura furcula* should be sought on trunks of willow or sallow; those of *C. bifida* on trunks of poplar and aspen; those of *C. vinula* on sallow, willow and poplar.

Trunks of birch and alder must be carefully searched for cocoons of *Cerura bicuspis*. (The lepidopterist who works for this species should read Dr. Chapman's instructive article *Ent. Record*, vii., p. 73).

The cocoons of *Cerura furcula* may be found by searching the dead wood of sallows, either on the tree or littered round the roots. They are generally at the base of a divergent branch, but sometimes on the straight, and very often at the hollow where a branch has been pulled off (Hewett).

Pupa-diggers will find most profitable occupation this month among the Notodonts—*Pterostoma palpina*, *Leiocampa dictaea*, *Notodonta ziczac* at foot of willows, sallows, poplars; *Drymonia trimacula* (*dodonea*) at oak; *Notodonta dromedarius*, *Leiocampa dictaeoides*, *Lophopteryx carmelita* at birch, &c.

November is the best month in which to find the delicate and weak cocoon of *Lophopteryx camelina* under moss, on trunks of oak, beech, elm, &c.

Pull off the bark from willow-trees and rough fences near, and you will frequently find the cocoons of *Pterostoma palpina*.

The cocoon of *Notodonta trepida* is to be found in November, at the roots of oak. The larva prefers a sandy, or at least a friable, soil in which to pupate.

The dry turfs collected in the corners at the roots of oak-trees should be well searched, also the angles themselves, for cocoons of *Drymonia chaonia* and *D. trimacula* (*dodonea*). Feel very carefully along the trunk, especially where the earth meets it, for adherent cocoons.

Spun-up poplar leaves should be collected for pupæ of *Clostera curtula*, and those of willows and sallows for *C. reclusa;* the pupæ of *Stauropus fagi* are to be found in spun-leaves of beech, birch, oak, &c.

About the middle of November look on the dark support or framework of lamps for *Asteroscopus sphinx*. [See also note for attracting *Poecilocampa populi* (*anteà* p. 104). Imagines of *Asteroscopus sphinx* generally attracted at the same time, also rest quietly on the sheet.]

Noctuides.—On warm evenings many larvæ come out to feed; they are especially numerous by sheltered woodsides, in wood-ridings, at the edge of sandhills, at foot of hedges, &c.

The pupæ of all the Tæniocampids may still be dug in November. A detached tree usually (but by no means always) gives much better results than those growing close together.

The pupæ of *Taeniocampa populeti* are to be found deep down at the roots of various kinds of poplars.

To keep eggs through the winter in a natural state of dampness, "I keep a clean smooth piece of that velvety moss which grows on old walls and cottage roofs, and, having carefully sprinkled the eggs over it, place it in a flower-pot, together with the food-plant; as the eggs sink into the moss, they cannot get shifted about; and, moreover, the moss will not entangle the legs of the newly-hatched larvæ. Of course the moss should be growing" (J. Hellins).

The eggs of *Cirrhoedia xerampelina* hatch from December to February (sometimes in November). The young larvæ feed only by night, on ash, though they will eat hawthorn and guelder-rose. Sometimes they attain a fair size before the spring, whilst others remain quite small; in the case of early-hatching larvæ the buds of hawthorn and guelder-rose will be found useful as a substitute for ash (Merrin).

Around the base of *Silene* and *Lychnis* plants pupæ of *Dianthoecia carpophaga*, *D. capsincola*, *D. conspersa*, &c., may be obtained.

Turn over stone heaps, &c., in November for *Dasypolia templi*, a widely-distributed insect in the north, but retiring in its habits. Where stone-walls are made from flat stones, the latter are often allowed to lie about in heaps, and, by turning them over, one or two *D. templi* may be found in every heap (Robson).

Pull off bark from willow-trees and rough fences near, for larvæ of *Apamea unanimis*, which hide away early; you will sometimes find pupæ of *Pterostoma palpina* when doing this.

The larvæ of *Noctua rhomboidea* make no objection to sliced potato, as food during winter. Many Agrotids will feed during the winter on carrots, buried in sand in a tub.

Sugar throughout November if the weather be suitable. You may get *Dasycampa rubiginea*, and, if not, such species as *Xylina semibrunnea*, *X. socia*, *X. rhizolitha*, *Calocampa vetusta*, *C. exoleta*, &c., will be attracted until the end of November.

At ivy *Dasycampa rubiginea* is usually found on blossoms partially hidden, and wants well searching for on bushes that cannot be beaten. It also appears to have a partiality for small detached bushes with but few heads of bloom (Mason).

At the latter end of November and beginning of December it was unusually mild, and the ivy-bloom over early, so I sugared regularly for a few days and obtained four *Dasycampa rubiginea*, two on November 28th, and two on December 1st (Mason).

Papilionides.—The eggs of *Thecla w-album* may be found on the twigs of elm, those of *T. pruni* on sloe, and those of *Zephyrus quercus* on oak, in their respective localities.

Leave the pupæ of *Papilio machaon* on the sticks on which they spin up; loose pupæ always emerge rather badly; the best success is obtained when the sticks bearing the pupæ are pinned up vertically. The same is true of pupæ of *Euchloë cardamines*.

IMPORTANT NOTICE.

Parts II and III and Index.

Part II of **Practical Hints** contains 144 pages of further hints similar to those to be found in this volume. Part III contains 140 pages, including also several chapters (illustrated) on a variety of practical subjects. It also contains the "Index" to all three parts—(1) General Index, 3 pages (double columns); (2) Special Index, 23 pages (double columns). The Index to Part I is, therefore, published with Part III.

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